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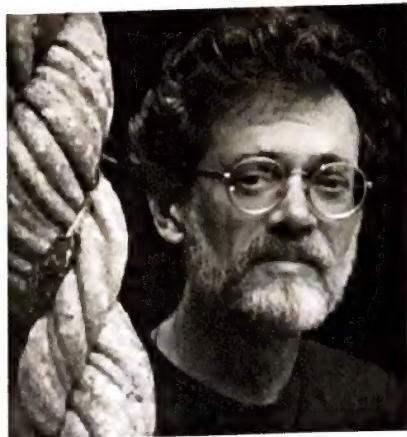
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Issue Ten • Winter 03/04

## c o n t e n t s

<b>Editorial: Ricaurtegate</b> <i>by Erik Davis</i>	4
<b>Drug Geeks</b> <i>by Earth &amp; Fire Erowid</i>	6
<b>On Fucking Up</b> <i>by Sheldon Norberg</i>	10
<b>Inna Bug Conference</b> <i>An interview with The Bad Shaman by Spiro Antonopoulos</i>	12
<b>The Bhang Nama</b> <i>by Hakim Bey</i>	16
<b>Do What I Do!</b> <i>by Adam Fish</i>	22
<b>Seeing Stars</b> <i>by Antonio Melechi</i>	26
<b>The Visual Language of Jason Tucker</b> <i>An Interview by Sarah T. Onin</i>	29
<b>Afro Celts: Seed of Change</b> <i>Interview by Scotto</i>	32
<b>This is Your Brain, On-Line</b> <i>by Ramez Naam</i>	38
<b>The Scrytch Page</b> <i>by Abrupt</i>	46

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James Kent

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**Associate Publisher**  
Jennifer Moon

**Contributing Editors**  
Erik Davis  
Earth Erowid  
Fire Erowid

**Contributors**  
Abrupt  
Spiros Antonopoulos  
Axcys  
Hakim Bey  
Tony B.  
Sheldon Drake  
P.MeO Diddy  
Adam Fish  
Dan Foss  
Naoto Hattori  
M.A. Horvath  
David Kessel  
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Sheldon Norberg  
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Jason Tucker  
Tonx  
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# Editorial

## ricaurte and rush taste the crow

**The revelation that Rush Limbaugh is a big fat opiate addict has been an unbridled source of joy for many of us here at Trip HQ.**

As with the news that William "Book of Virtues" Bennett was both a profligate and bad gambler, Rush's little secret let a little air out of the conservative juggernaut's fat, Humvee-worthy tires. We like to imagine Rush settling his considerable bulk onto side-by-side plastic chairs at an NA meeting in some YMCA and blurting out, "My name is Rush Limbaugh, and I am inordinately fond of pharmaceutical smack." Nor is our happiness restricted to *schadenfreude*, that marvelous German word for the pleasure one takes in the suffering and humiliation of one's enemies. We sincerely sympathize with anyone locked in the throes of serious substance abuse. But we also sympathize with the idea that American society might become less hysterically reactionary on the matter of drugs. The fact that a smart-ass slammer of degenerates and lefties like Rush could himself be taken down by hardcore pain pills just might spur a deeper shift in the public discussion of these substances. At the very least, we think in those foolish moments of hope that the "drug problem" will be recognized as something far more complex than the pat polarization of good meds and bad dope.

That's not going to happen anytime soon, but we are OK with that because we are still riding a blast of *schadenfreude* infinitely more tasty than the one produced by Rush's little peccadillo: the neuroscientist George Ricaurte's humiliating retraction of a controversial paper published last year in the prestigious journal *Science*. Ricaurte's original study reported that monkeys shot up with only moderately hefty doses of MDMA experienced "severe" damage to their dopamine systems, leading to Parkinson's-like symptoms and some deaths. Unfortunately, Ricaurte's grad students had actually been shooting up the animals with massive doses of methamphetamine. Doh! At least the monkeys got to taste full-bore trailer-park transcendence as they were sacrificed on the altar of blow-it science.

For those of us who track the thrills and spills of U.S. drug policy, Ricaurte has long been the player you love to hate: with the prestige of Johns Hopkins and the enormous research funds of NIDA behind him, Ricaurte has gone out of his way to provide politicians and the media with just the right scare stories about MDMA. Of course, Ricaurte helped establish the fact that MDMA is a neurotoxin in the first place, and he may well believe in his heart of hearts that MDMA is a scourge that God, operating under the auspices of NIDA, has put him on this earth to squelch. Nonetheless, he now finds himself on the butt-end of a morality tale. Contemplating the intense embarrassment and professional scrutiny Ricaurte now faces, not to mention the almost slapstick stupidity of the original error, some of us here at Trip HQ suspect that giggling karmic forces have been at work. Others believe the labels on the vials were switched by ELF, the Ecstasy Liberation Front, a shadowy group of renegade hippie shrinks rumored to have cornered the underground trade in glow sticks and to have abducted and psychologically deprogrammed a number of very bad trance DJs.

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**Unfortunately, Ricaurte's grad students had been shooting up the animals with massive doses of methamphetamine. Doh! At least the monkeys got to taste full-bore trailer-park transcendence as they were sacrificed on the altar of blow-it science.**

Like any good workman, Ricaurte blamed his tools — in this case, the suppliers. "We're not chemists. We get hundreds of chemicals here. It is not customary to check them." For its part, *Science* tried to put a happy face on the retraction by praising the lab for "so thoroughly investigating the conflicting data," an act they described as "an excellent example of how science is self-correcting." This may be true in a limited sense, but the unspoken reality is that, in today's America, politics overwhelm the scientific investigation of recreational drugs. All those noble warm-fuzzy feelings we nurse about falsifiability and peer review? Out the window. Even before the retraction, prominent scientists raised pointed questions about why Ricaurte's report was published in the first place, given that its results were so out of whack with what we know about MDMA — including the fact that ravers are not routinely required to dance over the corpses of their triple-dosing peers. To their credit, some major scientific journals have asked tough questions about the politics of all this. Ricaurte's paper only claimed damage to dopaminergic neurons, but *The Scientist* noted that in the original press package delivered to journalists, the word "damaged" was altered to "destroyed." *Nature* brought up the suspicious, or at least inappropriate, role that Alan Leshner played in publicly endorsing Ricaurte's study when it was first published. Besides heading up the American Association for the Advancement of Science, the body behind *Science*, Leshner was the former head of NIDA and oversaw Ricaurte's original grant.

I remember hearing Leshner hyping Ricaurte on NPR when the original report on Ricaurte's findings broke. Instead of sounding the usual cautionary notes and calls for more research that usually accompany new and puzzling scientific findings, he served up what amounted to a threat. I was furious, not so much at these two ideological lapdogs, but at NPR, which, like all the corporate media at the time, had caved in to the authority of official science without trying to peek behind the curtain. Ricaurte's paper was all politics by this point, nothing "self-correcting" or scientific about it. It was aimed to strike fear into the American public and to persuade senators and congresspeople contemplating the imminent passage of the insidious and draconian RAVE Act that lives needed to be saved. I suspect the act would have passed anyway, but Ricaurte's well-hyped flub certainly didn't hurt.

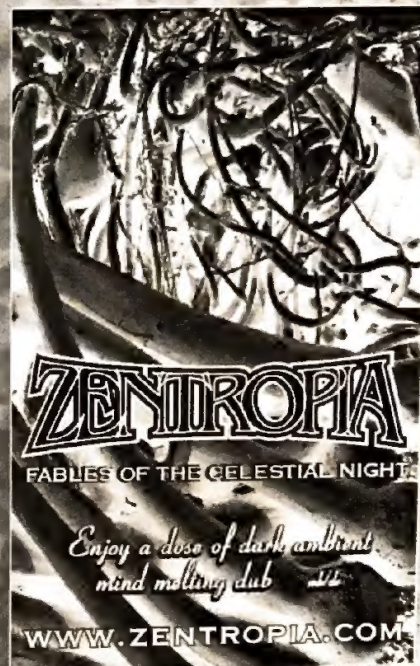
NPR probably ran a spot on the retraction, but I don't listen to it much anymore so I wouldn't know. Beyond the scientific journals, where Ricaurte will not easily make large controversial claims again, the American media reaction has been notable — but not surprising — for its tepid reaction. With a few exceptions, most of the hard political questions raised in the scientific press were never even broached, and the issue quickly disappeared. Moreover, the affair was almost universally characterized as an individual mistake, rather than a major indicator of deep systemic faults in the current scientific investigation of illegal recreational drugs. But major indicators about deep systemic faults are a dime a dozen these days. So I am afraid that, for the moment, we will have to content ourselves with the short-lived gloat of schadenfreude.

— Erik Davis, Contributing Editor

**About the cover:**

This issue's bizarre cover was created by surrealist master Naoto Hattori. You can see more of his work on page 12 of this issue, or you can visit his website at:

<http://www.wwwcomcom.com>





# Drug Geeks

## Informed Peers in the Psychoactive Community

By Earth & Fire Erowid

Everyone knows at least one: the walking encyclopedia of trivia about baseball or film or some other random topic... This article is adapted from a talk presented by Earth and Fire Erowid at Mind States III in Jamaica.

### *Did you know that the [random trivia here]?*

Those without connection to the psychoactive community are likely to believe the stereotype of the uneducated "druggie" blithely stumbling from one drug to the next. But perhaps they have just failed to recognize the "druggie" in that pharmacology or chemistry student intimately familiar with state-of-the-art journal references, or in the talented photographer, or perhaps in the exceptionally green-thumbed forensic pathologist. The "drug geek" is an individual who self-identifies as knowledgeable about psychoactives. They are interested in more than cursory details about the topic and are both interested in and willing to look up information. When sitting around talking with friends, they are the one who gets up to find an answer to a question. They do a web search, they look up info in a book, they're the one who has the books to look in. Within any group of friends, they are the individual whom others go to for questions about psychoactive drugs. They attend psychoactive-related conferences, meticulously document their own experiences in a journal, subscribe to psychedelic magazines to keep up with the latest knowledge, and browse trip reports "for fun."

Drug geeks don't necessarily use a lot of psychoactive drugs themselves. Many fulfill their interest by studying the subject, writing about it, or experiencing it vicariously through the writings of others. In some ways, this can provide a more consistent long-term relationship with psychoactives as it doesn't require the same energy, interest and time as buying and ingesting socially disapproved plants or chemicals. These types of self-taught experts are present in every field of study, within every hobby and every community. One of the differentiating factors is that it can be dangerous (legally, socially and professionally) to show this knowledge and expertise to those outside of the subculture. This adds a mystery school component to the system, creating secret experts — by day a normal college student, by night the leading expert in the Midwest on undetectable dorm room cultivation of psilocybin mushrooms.



### *The Collector*

One of the drug geek sub-types is the Collector. This is the individual who collects samples of as many different psychoactives as possible. They may not care if they have enough for a dose and they may not have any particular interest in ingesting the substances they collect. Their primary interest is in having a reference sample for their collection. The first time we encountered this type, a man offered to show us what he called his "Baseball Card Collection." From the context of the conversation, it was clear he was talking about psychoactives, but beyond that we had no idea. He brought out a small box filled with dozens of carefully labeled plastic bags, vials, and neatly folded bits of tinfoil. He opened each item, one by one, to show us the small pile of powder, pills, paper, or material inside. His collection included a wide array of tryptamines, phenethylamines, and curious plant extracts, many of which we had never seen before. He described when and how he'd acquired the materials, some more than ten years before. He told nostalgic stories about the experiences he'd had when taking a particular material or about the person from whom he had gotten it. Many of the items had stories about their provenance — what chemist made them, how they got from the chemist to him. He also had empty containers that had residue of substances from some of his most memorable experiences. He would smell them and offer them to us to smell as he told their stories.

Since that first encounter more than five years ago, we've



**He brought out a small box filled with dozens of carefully labeled plastic bags, vials, and neatly folded bits of tinfoil. He opened each item, one by one, to show us the small pile of powder, pills, paper, or material inside.**

met many others who fit into the Collector character type. Some Collectors specialize and focus on one or just a few substances, like the person who sent us a photo of his Ecstasy tablet collection including dozens of imprints, or those who collect LSD blotter art both dipped and undipped. Another Collector we've encountered has gathered all of the psychoactive chemicals he can find and plans to take a dose of each one and encase it in plastic, creating a collection of desktop paperweights which he thinks — even with scheduled drugs — might be quasi-legal.

### ***The Taster***

While the Collector collects objects, the Taster collects experiences. Tasters are people who want to have tried everything. They pride themselves on trying as many substances as possible, seeking out and being the first to experience new substances, and trying uncommon and interesting combinations. Often the Tasters don't take any one substance very many times and have no intention of doing so, but are just sampling the different flavors. It's not unusual for the Taster's excitement to be higher near the beginning of his or her relationship with psychoactives, and so, many Tasters are younger with less years of experience under their belts. But some go on to long careers of methodically finding and trying new substances. Some Tasters spend their time comparing and contrasting the similarities and subtle differences between the substance they've tried — MDA vs. MDMA or 2C-I vs. 2C-B — while others simply check each substance off their long list after trying it. But regardless of whether they are lusting after the elusive mescaline, 4-methyl-aminorex, or the almost mythical ALD-52, what Tasters have in common is their desire to try new substances.

### ***The Daredevil***

The Daredevil shares some characteristics with the Taster, but this type wants to push the limits of experience (and often of safety) by doing higher doses and having more mind-bending experiences than others. Many Daredevils don't qualify as drug geeks at all and are simply thrill-seekers, but there are those Daredevils who are actually looking to accumulate knowledge — part of the definition of a drug geek — by their willingness to push the boundaries

further than they have been pushed before. This type should not be confused with the Hardhead, although they do sometimes overlap.

### ***Plant Geeks***

Plant Geeks are those who focus their geekery on the plant kingdom. Some grow a wide variety of psychoactive plants, while others specialize on a particular genus or on plants that contain a specific substance. Plants may be chosen because of their academic, historical, cultural, or metaphysical significance, and again, may not be intended for ingestion. An earlier interest in ingesting psychoactives may have been transmuted into a longer-term interest in the botany, chemistry, and spirit of the plants. The relationship between humans and power plants or plant allies is important to many plant geeks.

We visited one Plant Geek while we were in a semi-tropical area outside the U.S. They showed us around their extensive outdoor garden, which included kava kava, banisteriopsis caapi, brugmansia, and many other psychoactive plants. They also showed us through their greenhouse, where they allowed us to photograph all of their plants but one. They asked us not to take pictures of that specific plant because they had a very special relationship with it which they did not want to endanger. Another Plant Geek we met had their entire property overgrown with *Salvia divinorum*. Hallways and sidewalks were lined with *Salvia* of all sizes, from the smallest cutting ("please take a couple!") to 9-foot tall flowering specimens which they were carefully hand-pollinating. Another has a cactus collection that is spread across several properties. He spends time finding new safe spots to plant his cacti, enlisting friends to help dig, carry, and move them from one location to another.

And then there's the world of Plant Geeks that focuses entirely on mushrooms and mushroom cultivation. From local mycology clubs that have substantial numbers of psilocybe-philos to the huge network of amateur and professional mycologists focusing on psychoactive varieties, the mushroom Plant Geek is a surprisingly common breed. One may focus on perfecting a specific technique for closet cultivation while another combs the local forests to find all the best spots to find them in the wild.

For people who are outside these subcultures it may be surprising that many of these people rarely (if ever) ingest any themselves, are hesitant or unwilling to initiate



# She said that she had some 2C-B. I told her, "We're not interested in buying any, but how would you feel if we took some pictures of what you've got?"

anyone new, and have no interest in selling anything. One myco-geek we met enjoys learning to cultivate new species of psilocybin-producing mushrooms, gets them to fruit, writes up his notes, buries the fruit, and starts with a new species.

## Chemistry Geek

One of the more prominent geek types is the Chemistry Geek. Everyone involved in this field of interest for long will eventually meet one. They range from the undergrad who dreams of mastering LSD synthesis to the professional Ph.D. with forty years of bench experience. They can often be identified by the bits of paper in their pockets covered with arachnoid scribbles of new molecules, analytical results, or synthesis steps.

While at Burning Man 2001, we were asked by a visitor if we could show them the structure of 4-methyl-aminorex. We were unable to find the structure in our small on-playa library and also failed to find anyone who knew the structure. This failure came up in conversation at Burning Man 2002 as we sat talking to a friendly chemist-type who stopped by our dome. He knew the 4-methyl-aminorex structure and drew it on the white board we keep strapped to the side of our dome, and went on his way. A different chemist, who stopped by the dome later that day, recognized the molecule (despite it not being labeled) and commented that he'd been thinking about the 4-methyl-aminorex synthesis process for a while but was still missing one part. He spent fifteen minutes carefully drawing a series of steps for a potential synthesis path, leaving a large space in the middle marked with a question mark. Another day passed and a third chemist dropped in, pausing in front of the

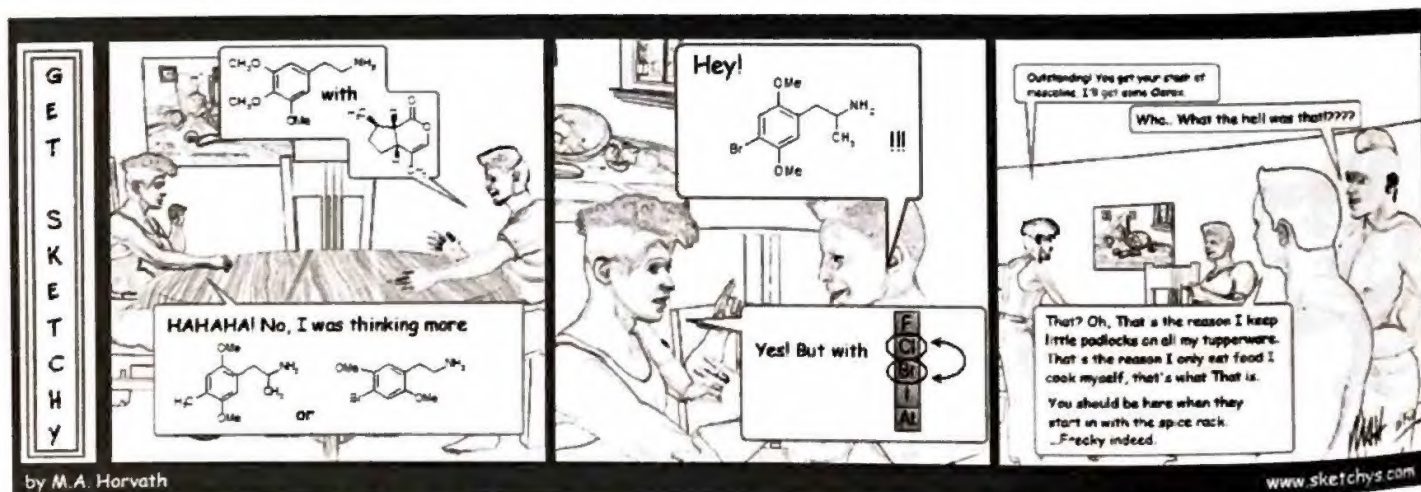
whiteboard. Noting the missing step, he commented, "Oh, that step is easy," erased the question mark and replaced it with another drawing of some benzene ring and squiggly lines and letters. Soon afterwards the chemist who had drawn the original synthesis returned to find his drawing completed. He got very excited and happily exclaimed, "Yes, yes! I think that would probably work!"

For those of us who have only a passing familiarity with organic chemistry or those for whom "the tryptamine backbone" is a meaningless phrase, the cryptic language of the Chemistry Geek is something to be experienced aesthetically. It seems a mix of technology and magic, somehow both modern and medieval in its translation from flask to writing and back again. There is something smile-inducing about watching Sasha Shulgin wave his arms as he talks about the "dirty pictures" of organic chemistry or listening to experienced chemists as they chatter at high speed in a dialect known only to them.

The Chemistry Geek is perhaps one of the most heralded of the drug geeks, both within the subculture and in the mainstream. There are Ph.D. programs and a large pharmaceutical industry that spur them onto ever-higher levels of geekery. It's one of the few drug geek subtypes that can reliably lead to a well-paid career, although most Chemistry Geeks must keep their less-approved interests very quiet lest they attract unwanted attention and scrutiny.

## Photo Geek

There are also those who prefer photographs of psychoactive plants and chemicals to the substances themselves. Like mainstream mycological photographers





we've met who don't particularly care for eating mushrooms, there are those who spend their time and energy seeking plants with psychoactive properties to capture as images. One of the benefits of this flavor of obsession is that it avoids some of the potential legal risks incurred by the geek types that like to handle, collect, or produce controlled substances.

Fire and I certainly qualify as Photo Geeks. My first thought when someone talks about a substance they've tried or a plant they're growing is to wonder how rude it would be to ask if we could take a picture of it. "Where's the camera?" runs through my mind along with "I wonder if the scanner is in the car..." At an outdoor all-night dance party a few years ago, a cute young female came up to us and asked us if we wanted any E. As a part of our process of watching and documenting the psychoactive-using subculture, we asked if she was selling any other substances. She replied that she also had 2C-B. I told her, "We're not interested in buying any, but how would you feel if we took some pictures of what you've got?" She was initially a little weirded out by our request, but she called over her boyfriend to consult. We got into a long conversation about their strange underground business of supplying psychoactives at parties and about the ethics of selling and their belief that their work helped strengthen the community. We then spent thirty minutes off in a corner photographing the nice individually labeled 22.5mg vials of 2C-B they were selling.

### The List Goes On...


These are only some of the more common varieties of specialist drug geeks. Perhaps the most common drug geek is the Generalist who is at heart interested in how psychoactives are (mis)used and (mis)understood by society, and who enjoys discovering and promulgating factual information. Supplement geeks know just the right combination of vitamins, minerals or nutraceuticals to pre-load for trips to improve effects, soften the come-down, recharge the day after, or rebalance the system. Law geeks read every related court opinion, monitor ongoing cases, know the flaws and vagaries of every psychoactive related law, and stay abreast of the minutiae of Federal Register filings by the DEA. The music geek collects and tracks which music is best to accompany each type of experience, or create their own to fill in where lacking. The history geek knows the origins of specific substances, which plants were traditionally used by which culture, who first synthesized psilocybin and in what year, when mescaline was scheduled and what government organization was in charge of drug laws at the time. The art geek keeps their finger on the pulse of psychoactive art: who keeps the best collections, where there are current showings, whose art has been used on LSD blotter. And the list goes on and on.

Regardless of the subject matter, specialists such as those described above serve an important purpose. Without those who focus great amounts of attention and

energy studying the unique and obscure details of a field, our knowledge would stagnate. It's easy to imagine that it's mega-corporations and big dollars which push knowledge, but behind those corporations are key individuals with a keen interest in learning or teaching or archiving or documenting. Whether they work in a field where they are well paid, or one where they volunteer their time, it is these information geeks that push the boundaries of knowledge and understanding.

*Earth & Fire Erowid are the founders and developers of The Vaults of Erowid (<http://www.erowid.org>), a well-respected library of unbiased information on psychoactive plants and chemicals.*





**Light Reading for the End of the World**  
by Scott O. Moore, Editor in Chief of Trip Magazine

"I laughed so hard rainbow colored snot came out my nose, then I cried like a baby, and then I puked my guts out. Of course, I was extremely drunk when I read it..."  
- James Kent, Trip Magazine

"The 'O' stands for orgasm!"  
- TAD

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# On Fucking Up

By Sheldon Norberg

"Taking more of a substance only shows that you're insensitive."

— Ralph Metzner

As a Harm-Reductionist and former psychedelic excessivist (one who has admittedly pulped his own mind through ill-considered psychedelic use), I've been thrilled to see the depth of information and understanding that has been accessed since I decided I could no longer handle my drugs, back around 1990. As I wade gingerly back into entheospace, I find myself concerned, however, over how well applied our HR standards are, even in our own entheo-community, among we "elders," and I wonder too, what is it we're trying to achieve in our journeys?

Since I fucked my head into recurrent end-of-the-world paranoid terror trips, self-disabling delusions, and general ego-inflationary fat-tire blowouts, it's been a serious intention of mine to GET OVER MYSELF. However, facing my fear of tripping, in the effort to heal myself through judicious use, has not been the ceaseless party I once pretended tripping was.

Part of me misses the par-tee, though, and that part is somewhat jealous of my still thrashing compatriots. I was chatting with a gal pal the other day about the feeling that often comes with a group trip (or in any altered environment), that you're wallowing in your psychobabble while everyone else is tripping the high road to Scotland afore ye. Scotland, Stonehenge, Saturn, communicating telepathically with multidimensional druids on Interstellar Overdrive while having Zoe7 space-goggled alien gangbang orgasms. In effect, showing you up as a lightweight, no fun, ground-floor neophyte dullard.

Perhaps it's true, and I do suck, and you all know it, but the thing I keep coming back to, even in my recent trap-door drop into the Chinese Box of God's Mind (read: a hit of Acacia resin), which revealed my own simplistic thought forms from moment to moment and culminated in a belly-laughing WHOA!, is to remember that I'm here in this body too! And that the wonder of the universe, while slightly less pulsatingly patterned in neon-fire colors, exists in every moment here. Solid. And that the exercises for ridding my mind of the "stinkin' thinkin'" require a great deal of focus here in this realm. The practice of stopping thinking, which allows one to truly enjoy the journey, requires some discipline. Once again, I'm reminded that my lifelong attempt to elevate my consciousness seemed



not to be attainable through ingestion alone.

And what about the protocols? As totally sock-knockin'-off and "bar-raising" as the aforementioned Acacia experience was/is, I'm wondering how many have had the opportunity to experience its majesty in a prepared environment. Not that anything can prepare you for its effects, but the rather non-ritualistic initiations performed by the continent-hopping cosmic-consciousness-cherry-popping-clown can leave your (not unfounded) doubts about the nature of reality (and your sanity) lingering for perhaps a moment too long.

A taste of my own medicine? Perhaps. I certainly spent my unrepentant youth proselytizing for acid, and there's no telling what people thought of me as they were ushered into the light, but even without understanding shamanic or psychotherapeutic protocols, I did try to provide a safety net. No matter what their own hard-headed self-assessment may be, without knowing your initiate's mind (and astrological transits, I'm learning from Grof's work), it can only be considered responsible (and friendly!) to take one's sitting duties seriously. Yeah, I know, I never had a sitter, never wanted one, "that shit's for whiners," but it does seem to



# Since I fucked my head into recurrent end-of-the-world paranoid terror trips, self-disabling delusions, and general ego-inflationary fat-tire blowouts, it's been a serious intention of mine to GET OVER MYSELF.

be part of the wise elders established methodology for a reason. Blowing people's minds is great fun, but so is putting their feet back on the ground – or whatever surface appears trustworthy at the time.

And what about neuroprotection? Scientifically documented but eschewed by those who prefer to believe the enlightening effects of their chemicals alone will protect them from brain damage, neuroprotection is far more necessary in today's world of amphetamine-based phenethylamines than it was when I was simply frying myself on acid. I'm no screaming media-hype freak, and I'm well aware that Ricuarte is out the window, but neurotoxicity from free-radical overloads appears to be quite real, and clearly preventable with proper antioxidant supplementing.

Of course, even that doesn't address our endless search for "the ultimate," which, it appears to me, is, if attainable, certainly not graspable. Yes, it may be an innate human drive for many of us, but I've realized that my race to experience what is beyond this life was only a race toward a death that will come in its own time, and that the experiences I'm truly seeking are those that remind me to be living here as intensely as possible.

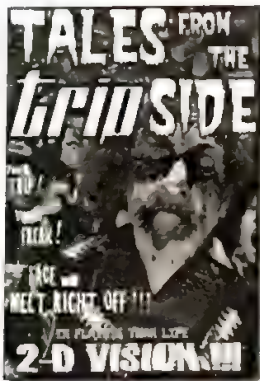
I myself don't really understand chemistry well enough to think out the biochemical ramifications of putting several drugs together, but admittedly, I've done it anyway. Fortunately, they were fairly well understood combinations, like candyflipping. It's always interesting to chart new ground, try new things, relinquish control, but what is the macho tripper game of "prove it" really proving? For the kid discussed on CBS's Erowid report, it proved that he was unable to draw a reasonable inference from the experience report entitled "A Baseball Bat to the Head." Even with the advantage of experience reports though, issues of body weight, reporters' experience level, and their astrological transit data is often missing or non-existent. This leaves a lot of latitude for misjudgment even by the Erowid-informed reader.

Don't get me wrong, Erowid rocks! And obviously, those of us who want the term "responsible drug user" to enter the vernacular want to distance ourselves as much as possible from those who are blowing it. But one bad trip gets 10,000 times as much press as a good one, and the only way to promote conscientious use at every level is to model it, at

every level. I would hate to suggest that tripping shouldn't be fun, joyous, ecstatic, hilarious, and irreverent, but I've gotten a bit stodgy in my dodderage, and tend to think of tripping also as work. Are my trips leading me to better personhood? Am I applying the information I gather from entheo-entities to living in this plane? Am I helping others through this web of interconnectivity? I'm hoping we can recognize that tripping should also be reverent, healing, transformative, focused, artistic, and above all, deeply considered, in order to take it out of marginalization and into the cultural hub where it belongs.

*Sheldon Norberg is the author and performer of Confessions of a Dope Dealer - you'll find him at [www.adopedealer.com](http://www.adopedealer.com).*





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# Inna Bug Conference

## Insectoidal Nourishment and the Bad Shaman

Interview by Spiros Antonopoulos

The Bad Shaman, while barely known, needs nor wants little introduction. He's a hard-working American ayahuascero; A successful entrepreneur; conscientious psychonaut; researcher of arcane plants, animals and insects. He remains perfectly comfortable surfing the edge of obscurity. Like the shaman in many of history's archaic societies, he lives and works on the outskirts. We visit the shaman as a last resort. His ways elude sense and nonsense. His mojo works, but never as we expect it to and always at a price. He would be the first to push you down the stairs if it might cure what ailed you. He may even ask to eat your brains, but that's another story...

### *humans eating bugs*

**TRIP:** What's the history of bug eating?

**BAD SHAMAN:** Primates and humans have consumed insects since Neolithic and Prehistoric times. Only recently, within the last 100 years, has insect eating gone out of fashion, except in small rural areas of Mexico, China and a handful of other remote areas. Throughout history, insect eating has been a main source of food for most mammals and birds.

### **How do bugs taste?**

Of the 70 species of insects that I've sampled, the only ones that weren't very appetizing were ladybugs. And I've eaten grubs, larvae, beetles, wasps, sow bugs (roly-poly bugs), mealworms, pine grubs, post beetles, earwigs... Insects are surprisingly tasty and comprise the spectrum of flavors... from nuts to vegetables.

### **Earwigs couldn't be too tasty.**

They are surprisingly tasty. Stir fried with rice and snow peas. Very yummy. I'd like to order some out right now..

### **Which bugs are the yummiest?**

The roly-poly bugs. They can taste like anything from spinach to oysters depending upon habitat. And if you cook them, they can be made to taste like just about anything.

### **If folks could get over the base level aversion, it sounds like roly-poly bugs could usurp tofu.**

Yep, and that leads me to my basic assertion: If you eat shrimp and you can't eat grasshoppers, you better re-examine your taxonomy/zoology.



### *ant eating*

**Tell us about psychoactive insects.**

Psychoactivity in insects is esoteric at best. Certainly there have been reports of psychoactive honeys from bees in the new world and the old world. Rumors and stories abound. There is a tradition in southern California and the Southwest of eating red harvester ants for their hallucinogenic psychoactivity in the acquisition of spirit helpers.

### **How did you come upon such esoteric knowledge?**

I have been interested in ant consumption by humans in different cultures around the world for over 25 years, and I read scientific papers. For example, ants are no longer an imaginary food source. There are serious papers being presented by entomologists suggesting that eating more insects may solve some world hunger problems and be an excellent source of nutrients for humans.

Traditionally, insect information and lore have been considered a female knowledge since the hunter gatherer societies didn't share equally in the vertebrate proteins. That is, men would kill the animals and thus procure most of the vertebrate proteins, leaving women to gathering plants. In doing so the women would also learn about what bugs you could eat. They knew that since insects and plants co-evolved in such a similar environment and parallel evolutionary scheme, their ability to transform plant products into insect poisons is an evolutionary strategy that nature has tried again and again successfully. Insect and arachnid poisons are currently being researched in venom therapies, much like the bee venom therapies used by the Greeks and Romans for thousands of years.



# There is a tradition in southern California and the Southwest of eating red harvester ants for their hallucinogenic psychoactivity in the acquisition of spirit helpers.

## Where do the ants come in?

Primarily in central and southern California. Several tribes used the Pogo for their spirit helper acquisition powers. A person ate a prescribed number of ants and went into a dream state for a couple of hours in which (God willing) a spirit helper would appear in the form of an animal.

## So this isn't recreational drug use.

No, their use was mostly therapeutic. Ants have had therapeutic value with the tribes in southern California and other native peoples throughout the Americas. I met a Dr. Rodriguez from the University of California at Irvine who told me, 25 years ago, that there are 20,000 species of ants in Columbia. And Columbia is already the mother source of many of the poisons that the world is aware of today: tobacco, coca, those sorts of things...

## How have you used the red harvester ants?

Over the years I have eaten ants both therapeutically and for the psychoactive effects. I had heard tales of ants being used for arthritis and rheumatism for years. And I have found sources indicating that indigenous cultures from South, Central, and North America have used ants in that way. So I would capture and eat a small quantity of ants for their beneficial effects with rheumatism. The ant that we have in New Mexico is a particular harvester ant in the species *Pogonomyrmex californicus*, which is specifically known for its venom. There are so many types of ants and each ant has a different ability to produce different types of chemicals and venoms.

Ants have the oldest history of farming. They invented agriculture over 60,000 years ago. They are able to grow funguses on harvested plant materials and control the growth of unwanted fungi and microorganisms with antiseptic sprays that they produce with their bodies.

The particular ant of which I currently speak has a historical tradition, and people at the turn of the last century knew about it. J.P. Harrington, a researcher who worked and lived at that time in the Santa Barbara area, documented two matching ceremonial accounts of ant consumption.

## Have the venoms been analyzed for their active constituents?

To a small degree. But since there are so many compounds in ant venoms, it's a process that's ongoing. I suspect that even in the back annals of scientific literature, this is probably not a popular subject. But it is becoming more popular (see references).

## visionquestions

### Please explain the traditional ceremonial techniques.

In the recorded anecdotes of native peoples giving ants in a prescribed way, that is, ceremonially, eagle down or cotton is used. The ants would be collected from the ant hive, four or five per cotton ball or feather. The cotton ball was then bitten and swallowed. The person would then wait a period of time, and then with the help of an administrator, would go into a sleep state for a couple of hours, after which they would be administered warm water which would help them regurgitate whatever ants might be left in their stomach. It was important that they consume ants while they were still alive.

I've eaten a couple of hundred ants and I find that there certainly is a neurotoxic, or psychoactive effect. But as far as going into a dream state, passing out, and acquiring spirit helpers, I have yet to reach that level of saturation.

### Can one obtain the same prescribed effect from dead ants or the extract? What has been your most successful experimental technique to date?

Ants are plentiful and easy to collect. I've found that using a glass pie pan with beer, water, juice or mescal, one can collect a rather large amount of ants in a short amount of time. The LD50, i.e., the lethal dose of ants, is about 1000, swallowing live ants, so a participant would want to consume about a third to half that amount. Be aware that there is a lethal toxicity to the harvester ants which have been traditionally used, and which I have been consuming.

### It's a bit like walking towards death...

People who are interested should research the literature before attempting to consume any ants. Again, it can be





## **When the ants bit my tongue it took about four or five hours for the burning sting to dissipate.**

fatal and I don't recommend it. The bite from this ant is extremely painful and will linger for hours, sometimes days.

**Why are you using these particular liquids as the base for your extractions?**

This is how we find out what solution is more likely to extract the ant's psychoactive properties. The beer may extract qualities with alcohols that mescal doesn't have. It may turn out that eating live ants is ultimately what has to be done to get them to exude their compounds in the time that you want and the quantity that you need.

**Are the compounds oil-based?**

There are high molecular weight compounds and low molecular weight ones. So I would think that they would have an affinity to many things because it is such a complex mix of proteins and histamines and serotonin-like compounds.

**About an hour after I sampled the mescal extract, I was overcome with a severe heaviness. It was rather dark, but not particularly scary. Definitely a meet-your-maker heaviness. Is this typical?**

I'm sure there's a dose-response curve where at lower doses one could have physical benefits while at higher doses you could have psychoactivity, and at even higher doses one could have hallucinogenic activity. But this is an area of avant-garde research. Very basic work still needs to be done, but certainly here is an open field of potential for beginning to understand psychoactive insects as we have with psychoactive plants.

In Mexico, centipedes and wasps were commonly revered for their poisonous qualities and there were often beverages made from them.

**How would you compare the ant buzz to a more commonly known psychoactive plant-based poison like datura?**

Oh, it's nothing like datura. And actually that's not a fair comparison at all. It's much more like the poison of the tarantella, the wolf spider of Europe.

Would you like to see some ants that I've collected?

***juicing antcastles***

**[The Bad Shaman displays his dead ant collection and the extracts. He takes a sip from one beaker, and offers it to me.]**

This one has a very peculiar taste...

**[Souljerky gulps some ant beer.]**

Very ant-y...

**How would you describe the taste of ants?**

Different ants have different tastes. These particular ants have a lemon-lime Sprite-like taste. Not the formaldehyde and formic acid tastes of other types of ants. Nor the sweet buttery taste of black ants. Or the honey taste of honey pod ants.

**While this is unexplored territory, it's not for the faint or foolhardy.**

No. It's literally like playing in a wasp's or hornet's nest. Ants pack as powerful a venom and sting as those insects.

**You've been bitten a few times playing in the nest.**

When the ants bit my tongue, it took about four or five hours for the burning sting to dissipate.

**What about other psychoactive bugs? [The Bad Shaman opens another neatly packaged box containing dried iridescent beetles.]**

These were gathered in the Mexican province of Chululah near Puebla. Terence McKenna speculated that the iridescent green was a signature of psychoactivity in bugs. These guys lived in an acacia tree at night and were attracted to the local poppies during the daytime. So I thought that may be a good indication that they were sequestering some psychoactive properties from the trees and flowers.

**Have you tried them?**

Well, we've smoked them and eaten them and there's mild psychoactivity. But we really haven't jumped into these bugs with both feet yet. We're still trying to collect more background information before I start consuming something that could always be potentially lethal in its poison.



### How does it compare to the ants?

That's comparing apples and oranges. Beetles and wasp like ants. I was reading, however, that there's a beetle in Brazil that is raised in peanuts and eaten for rheumatism and arthritis. So I suppose there are a few parallels. Insects are often medicine in traditional cultures; the problem is the scarcity of professionally trained ethno-entomologists that can ask the question, "What insects were/are you using for medicines?" Interestingly, Merck currently has an agreement with Costa Rica to categorize not only all their plants but all of their insects, aware that insects are a possible source for chemicals and medicine. And why wouldn't they be? Plants are certainly a source of medicine. Perhaps this is just the tip of an iceberg that we've yet to explore scientifically. It could hold a cure - perhaps even the cockroach holds the cure for cancer or some other unimaginable terminal disease.

### Even so, do you have any moral issues with ant eating?

I do. I am concerned with the taking of life for certain solely psychoactive purposes, but for therapeutic purposes I find that it's a medicine that's worthwhile.

### There's a theory that the ant colony is a collective consciousness and that the living anima rests not within the individual ant, but with large groups of them...

Within their collective brain the ability to learn advances with each generation. The ants on this mound probably exist over a quarter acre or so. They know this environment so intimately because they are constantly searching to see what's out there and what's available. And the sheer quantity of them. We have no idea what it's like. They've dug underneath all of this area. There are literally tens of thousands of them.

### Hell, it's more crowded in New York City, so humans do actually have an idea of what it's like. What do you think about the ol' role reversal, HG Wells' *Empire of the Ants* and perhaps ants eating humans?

How do we know they don't? Fuck this article, we should do a movie.

#### The Bad Shaman's insect eating reading list

The Eat A Bug Cookbook by David George Gordon

Man Eating Bugs: The Art and Science of Eating Insects by Peter Menzel, Faith D'Aluisio

Creepy Crawly Cuisine: The Gourmet Guide to Edible Insects by Julieta Ramos Elorduy, Peter Menzel

[http://www.dcothai.com/food\\_insects.htm](http://www.dcothai.com/food_insects.htm)

[http://www.food\\_insects.com](http://www.food_insects.com)

Spiras Antimopoulos currently focuses most of his time and attention preparing and serving a sweet spiced milk tea (masala chai) to the frequenters of Ashtanga Yoga NY & Sri Ganesha Temple, in a small corner of the 2nd floor dubbed the Sri Ganesha Tea & Book Stall.

[http://souljerky.com/ganapa\\_tea/](http://souljerky.com/ganapa_tea/)

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# The Bhang Nama

By Hakim Bey

Dedicated to Ira Cohen the Majoun Traveler

Wine shows the way to the hermitage  
of the Shaykh of Love  
but hashish is the Refuge itself.

— Fuzuli

One traverses the same paths of thought as before. Only they  
seem strewn with roses.

— Walter Benjamin, *Über Hashish*

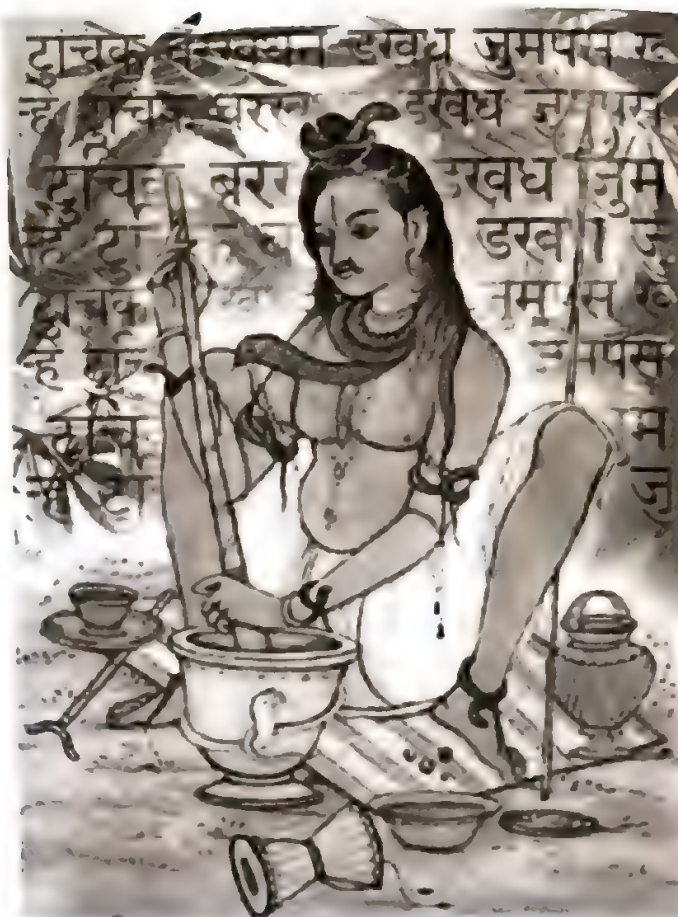
## Cannabis as Sacrament

What is a Bhang Nama? A nama is a treatise or monograph. Bhang is cannabis hemp, mostly as prepared in a drinkable form, a very old word in the Indo-Iranian languages. Cannabis itself means aromatic hemp in Semitic languages and may derive from a Sumerian word, but *cana* also means hemp (or “cane”) in Sanskrit, thus the word is undoubtedly of extremely archaic origins.

A number of bhang namas were written in Turkish, Persian, Urdu and other languages. I used to have a translation of one from Urdu but lost it long ago. It was a short poetic piece praising hemp as the “Green Parrot,” the perfect Sufi master, etc., in the usual vein, as for instance in Fuzuli, a medieval Turkish poet and devotee of the herb. Hemp is compared to the “wine” of the Sufis, and of the Christian monks (who were much admired by Persian Sufis as true mystics, like the Zoroastrian mobeds or priests, also well-known wine-bibbers). Cannabis is discussed as a “mode” of contemplation in itself, almost as a source of initiation.

Indeed as a bringer of dreams and visions any powerful psychotropic can be considered a source of initiation, since initiation can emanate from imaginal personae as well as from live human teachers. In shamanism the plants themselves are identified as spirit-teachers. In monotheist religion these spirits become more and more metaphorical — and finally degenerate into mere allegories. Fuzuli, however, (perhaps under the influence of Turkic shamanism) personifies hashish as a “shaykh.”

Islam of course has no sacraments in the Christian sense, or in the Vedic sense of Soma. If hashish can be described as playing a sacramental role in Sufism, then the terms must be taken as metaphors — and the Sufism in question would even so still be considered heretical or criminal in the opinion of most Islamic jurists. (Unless even the hashish were nothing but a metaphor!) The dervishes, no matter



how heterodox, consider cannabis to be holy indeed, but not divine. They say it should be exempted from the Prophet's restriction on intoxicants because it constitutes a valid short-cut on the mystic Path — not because it is an Idol to be worshipped.

However, in the Moorish Orthodox Church, we do consider cannabis to be a sacrament. Although we offer no dogmatic definition of this term, we believe that hemp is something more than a technique. Sufi poets may call bhang the wine of love, etc., but for them it is not a cultic part of their religion. For us, it is.

In Christianity the sacramental wine and bread are considered the blood and flesh of the divine; they become this blood and flesh because of a spiritual/alchemical act of transmutation on the part of the initiated priest. Now, although it is possible to consider hemp as a god — or rather as a goddess — the Moorish Orthodox Church does not follow Christian sacramental doctrine. For us, you might say, the herb is already the corporeal manifestation of the divine; the “transubstantiation” takes place in a conjuncture of this manifestation with human awareness. In fact, this conjuncture is for us the one rite that defines our “church” (whether a given member partakes or not is irrelevant) and therefore acquires for us a sacramental status.

If we were to argue that hemp should be legalized, we would insist on its recognition not only as medicine, but (more important to us) as sacrament. In fact as an antinomian church we reject the validity of law in any case.



# **The Shiva who uses hemp is called Bhola, the Fool. He is the mendicant mad Shiva and himself a wild saddhu, naked and ash-covered, haunter of cremation-grounds.**

In some ways we might almost prefer our sacrament to remain illegal — because in relation to the Civilization of Empty Simulacra, a genuine and effective sacrament should only appear as a crime. If it were not for the suffering of those who are sacrificed to the make-believe jihad of zero tolerance we would consider legality a moot point.

Unfortunately the legalization movement is probably wasting its time and energy, since the economic and ideological investment of the Great Satan in its war on drugs has reached too vast a depth to be dissolved by mere Reform. Populations may vote for decriminalization, but voting will have no effect on history. Real giants are not felled by tilting against conceptual windmills.

In other words, Prohibition is deeply symptomatic — and a symptom cannot be eradicated unless the disease itself is cured. The disease could be identified as Global Civilization as presently understood, i.e. as the final and perfect flowering of transnational Capital and “American” consumer culture. “Legalization” then would be possible only in the context of a reformation so marked as to constitute something more than even a revolution; perhaps a transvaluation of all values. Meanwhile, the point is to get on with the healing, or the ritual, or the simple pleasure — not to court martyrdom. In a certain limited but very real sense, after all, freedom is what you can get away with.

Returning to the question of defining a sacrament — I would offer it as my own opinion that the Moorish Orthodox Church looks on hemp very much as the Shiva worshipers of India do. A real devotee might use it every day, but every Shaivite is free to do so and should do so at least once a year on the last day of Durga-puja. Orthodox Hindus take it as bhang, since they believe smoking is irreligious, although the saddhus generally claim an exemption to this rule.

Bhang is not identified specifically as a god in any Hindu source known to me, but because it “partakes” of the nature of Soma (and because God Himself, Shiva, consumes it) we might say (theologically speaking) that cannabis can be considered quasi-sacramental in Shaivism. Or perhaps semi-sacramental. Inasmuch as drinkers or smokers “offer it to Shiva” when using it they confer on it the function of sacrifice.

The Shiva who uses hemp is called Bhola, the Fool. He is the mendicant mad Shiva and himself a wild saddhu, naked and ash-covered, haunter of cremation-grounds, etc. He’s to be visualized blue-skinned, hair tied with live snakes, smoking a chillum, as the goddess Parvati sits beside him preparing more ganja. She would do this by slightly roasting the palmate leaves and buds, washing them,

wringing out the mass, then chopping it up with some tobacco. The chillum is lit with hot coals lifted from the fire with Shiva’s tongs, and the mouthpiece protected with a slightly damp cloth. (Obviously some of these techniques are modern, such as the tobacco mixture — others may be quite ancient.) In smoking a chillum, the point is not to touch the cloth with one’s lips, otherwise any method of holding it will do. Some of the saddhus had fancy two-handed grips I could never duplicate.

Perhaps Bhola drinks bhang from his human-skull-cup, or serves it to his boon companions the graveyard ghouls, efrits, forest fairies, nagas, ogres and magic dwarves. What would God say as he drinks or smokes? His followers on Earth the saddhus touch the chillum to their foreheads and repeat the mantra “Bom Shankar” (hail Shiva) or “Bom Bom Bhola!” or “Bholanath,” Lord Bhola. (“Bom” is a form of OM, the basic mantra. “Bhola” is pronounced with the “h” in the first syllable, b-h-o, and the second syllable la becomes lay, as if the whole word rhymed with the Spanish word Ole! — which of course is simply a “corruption” of “Allah!”)

“Bom Bom Bhola!” is not really an initiatic mantra in the sense of being restricted to those who “receive” it from their guru. It functions more as a prayer, or even a toast! (It is even arguable that the slightly comic sound of bom bom is deliberate.) I learned it from the late Ganesh Baba in Darjeeling in 1969. He also taught me the proper way to smoke hemp as a sacrament — but this was not an “initiation” either — at least not in the strict sense.

Ganesh Baba later traveled to England and America in the 1970s and taught these simple “rules” to many Westerners. He himself smoked constantly, and struck many of his devotees as the incarnation not only of his patron deity Ganesha, the elephant-headed son of Shiva, but also as the “incarnation” of Cannabis itself. He introduced me to my Tantric guru Sri Kamanaransan Biswas — this is another story — but I should mention here that Mr. Biswas also considered hemp a proper sacrament in his version of the cult of Kali (as Tara, the Star), although he himself preferred brandy.

Here then are Ganesh Baba’s rules for smoking hemp.

1) Whether cross-legged or sitting in a chair, when smoking one should sit up straight, backbone perfectly aligned.

2) One should dedicate one’s smoking to Lord Shiva.

The basic reason for these guidelines is to make the smoker conscious and aware — to direct the attention. To smoke absent-mindedly would constitute a waste of the



sacred herb (you can go higher if you focus).

Obviously the "divine Other" doesn't have to be Lord Shiva. Certain Rastafarians, who also consider the herb a sacrament, would make a different dedication. The dervishes often invoked "Ya! Lal Shabazz Qalandar!", a famous hemp-using saint and leader of the Qalandariyya, a Sufi order centered around his tomb in Sindh. I imagine that Shaykh Haydar was once evoked in this fashion — and perhaps even Hasan-i Sabbah, the Assassins' "Old Man of the Mountain." These figures are of course not "gods," but they serve an angelic function.

As for the backbone rule, this too has a more esoteric aspect. The spine "contains" Kundalini, the snake goddess of enlightenment. The chakras or subtle centers of the body

## ***Of Hashisheens and Assassins***

Ismaili ("Assassin") studies have made some progress since the thirteenth century — and even since the nineteenth century! — so one notes with surprise that most of our modern "drug researchers" simply repeat the old legends from Arnold of Lubeck and Marco Polo as if they were gospel truth — history! — in the sense of history as "what really happened." The Assassin legends possess great significance as legends and can be analyzed for their "meanings" (as the Sufis say) — but certainly the researchers can be faulted for failing to ask what the Ismailis themselves think about these occidental romances. Needless to say, the Ismailis have opinions on the matter, and modern scholars have opinions about those opinions, etc.

Most of the drug researchers cite the classic article by A. Silvestre de Sacy, which appeared in 1818. De Sacy's monograph was a masterpiece of the period and still well worth reading. However it is wrong on several important points. De Sacy's real contribution remains his discovery that the word assassin, found in several European languages, is derived from or related to the Arabic term hashisheen meaning "users of hashish."

Neither Arnold of Lubeck nor Marco Polo used the word hashish in their stories about the Old Man of the Mountain. Lubeck mentions a "potion" of "ecstasy and oblivion," and Marco Polo actually names the potion as opium. In terms of the story, this makes more sense than hashish, since the purpose of the potion in both versions is to send the young recruits into a stupor so that they can be carried into the Old Man's secret garden. When they come to, they are told that the garden is paradise, and that if they are martyred in the path of devotion to the cause they will return to the garden for their eternal reward (as promised and described in the beautiful paradise verses of the Koran). After sampling the garden's pleasures, they are doped again and carried back into the profane world, presumably fired with a belief in literal life after death.

De Sacy concluded on this slender basis that the Old Man's potion was hashish. He reasoned that since the Ismailis were called hashisheen by their enemies they must have used hashish in some way — and the legends provided an explanation. De Sacy therefore used a good etymology to prove a dubious legend, then used the legend to bolster his etymology. Unfortunately there would later appear numerous reasons to reject this solution. First, it depends on the notion that hashish was still largely unknown in the medieval Islamic world, since otherwise the recruits might well have recognized its effects and seen through the Old Man's trick. But in fact hashish was quite well known in the whole area and had been since at least the Neolithic. This can be demonstrated archaeologically. Second: there were no hidden or secret gardens in any Ismaili castle so far excavated by archaeologists, either in Persia or Syria. This is only "negative evidence" of course. Perhaps the garden was located in the valley beneath the castle (this might have been possible at Alamut, for example). But negative evidence continues to pile up, so to speak.

## **Civilization depends on mediation. The priest mediates between us and the gods, the king mediates between us and power.**

are linked by Kundalini. Thus by becoming aware of this pathway, one can "send" the smoke to any of these centers — for example the genital center for sexual pleasure, the heart for emotion or imagination, the head for cerebration, the top of the skull for ecstatic enlightenment, the "third eye" for vision, etc. One can also deploy the herb in this manner for healing purposes. This cannot be called Kundalini Yoga and should not be confused with it. Anyone can "realize" this pathway through visualization — it seems quite "empirical," and has immediate effects. It requires no special initiation or instruction.

Some might ask whether such a process could possibly be dangerous. Kundalini power can be "mishandled" with dire results according to the literature. To repeat: this simple visualization of "channeling the smoke" should not be confused with Kundalini yoga. And in any case, any psychotropic can be dangerous. No risk, no reward.

But cannabis has proven (over at least 5000 years) to be the most amiable and healthful of the real psychotropics. Although large doses of powerful cannabis — like those used by the Club des Hachichins in Paris — can be truly hallucinogenic, most conscious users nowadays prefer milder effects. In fact the reader might ask why the Moorish Orthodox Church adopted the herb as its sacrament when much more powerful entheogens are found among the mushroom and cactus and other families. The answer lies in the Islamic influence that reached us not only through the Moorish-American tradition but also through our early research in the history of the Assassins or Nizari Ismailis of Alamut (at the time we remained unaware of parallel research by Gysin and Burroughs).



Under the influence of De Sacy and the good Dr. Moreau, the Club des Hashichins carried out a reversal of the meaning of the legends and found therein a source of teaching rather than simply the old frisson of exotic terror. Baudelaire and the others began the work of developing a kind of spiritual path free of religion, a path that Walter Benjamin was later to call "Profane Illumination." Thus they gave a positive reading to many aspects of the legend formerly seen as scandalous, impious, or mad. They intuited a path based not on faith but on experience. Thus although their only sources for Ismaili doctrine were false legends contaminated with anti-Ismaili propaganda, they were actually able to intuit certain profound truths about esoteric Ismailism. The "enlightenment experience" is always fraught with the potential for antinomianism and spiritual autonomy; this explains why organized religions are always so anxious to mediate such experiences, and so often distrustful of even the most pious mystics. There seems no doubt that in certain advanced esoteric Ismaili circles all outer forms were discarded, not only Law and religion but even "the Imam," in favor of direct experience of the inner divine.

This "freethinking" antinomianism cannot be understood without reference to Ismaili doctrines of social revolution. In this sense they appear as precursors of such 17th century Protestant revolutionaries as the Ranters, or later anti-authoritarian Masonic "Deists" like John Toland — or, for that matter, the Club des Hashichins and W. Benjamin. Conspiracy theorists like Joseph von Hamman-Purgstall, who detected hidden linkages among Assassins, Templars, Illuminati, and the French Revolution — and hated them all with a pure reactionary fervor — may have been wrong from an historical point of view, but nevertheless "on to something" from the perspective of an illusive intuition or taste. That is: there really is something inherently revolutionary about Ismailism; and there really is something inherently experiential about the "spiritual use" of hashish, something that poses a threat to the mediation of religion and to the validity of an authority based not so much on order and sobriety as on the suppression of autonomy and intoxication. In fact the deeper meanings of the Assassin legends begin to become clear only when we are freed from the burden of their spurious historicity. There is "truth" in the legends — but not the "truth" of history. "What really happened" in this case took place (as hashish smokers might say) on another plane. And that plane is accessible.

### ***The Economics of Transcendence***

It was this accessibility that intrigued us in the early days of the Moorish Orthodox Church. We were closely allied with certain psychedelic sects such as the Neo-American church, the Sri Ram Ashram, and Leary's IFIF at Millbrook, but we did not consider ourselves a "single issue" organization. As individuals some of us tried powerful entheogens, but as a church we wanted a sacrament with more congregational uses, so to speak. Pot potentiates (as the common wisdom says), intensifies whatever you're doing: talking, playing,

or listening to music, and so on, as well as more individual creative or contemplative pursuits — a psychotropic for all seasons.

At that time New York was blessed with a steady supply of excellent Lebanese hashish, gold or red, along with reliable Mexican marijuana for \$40 an ounce, and the occasional New World exotic, Panamanian or Acapulco, etc. The new hybrids, sinsemillas and hydroponics are no "stronger" than some of these old classics, despite propaganda to the contrary (emanating from growers as well as cops). Modern horticulturists have attained reliable methods for growing excellent cannabis under acutely restrictive conditions, but only at great expense.

Proponents of legalization argue that the end of prohibition would lower prices — but I'm not so certain of this. Legalization would mean commercialization, an attempted take-over by Global Capital. Coffee, tea, chocolate, alcohol, and tobacco were originally considered shamanic or psychotropic "drugs," and all of them have been banned somewhere at some time or other. (In the Islamic world people were executed for using coffee and tobacco.) Commercialization has "de-natured" them now and made them less potent as holy psychotropics, both in the cultural/psychological sense and in physical reality as well. Commercial varieties of plants or preparations of plants are deliberately made weaker rather than actually improved. This is no "accidental" effect of Capital, but rather one of its "iron laws."

You might say that in Capital the image always tends to replace the actuality because the image is cheaper to produce — also, the image never really satisfies and therefore must always be consumed again. Moreover, the Market prefers to sell a million red apples to a million people, not 2000 red apples to 2000 red-apple-lovers, 4322 Russets to Russet-fanciers, 311 greens to pie-makers, 902 Tawny Pippins, etc. In order to please "everyone," the million identical apples must please no one in particular, and therefore must be rather tasteless. Shelf-life and shiny skins (with no blemishes) prove to be far more commercially viable factors than flavor — and after a few generations no one remembers the actual taste of the old varieties. They come to believe that apples should look like Biblical archetypes but taste like raw potatoes; they actually fear the experience of a strong and definite flavor. ("There must be something wrong with this apple, it tastes funny...") The ideal commodity would be devoid of all dangerous psychotropic "taste" — and yet highly addictive — like commercial tobacco.

Agribusiness thus achieves the total degradation of both its products and its customers — Q.e.d.

From the point of view of Capital, it may already appear too late to commodify cannabis in this way. Commercial blandness would simply result in massive bootlegging and tax-evasion, as illegal growers supplied the already-existing global market with the quality it knows and demands. Capital benefits from prohibition of cannabis and other "dangerous drugs" by the social control mechanisms of fear it generates, by the vast amounts of "dirty" money that flow into the banking system, by the huge private



## With the rise of Civilization entheogens are either de-natured or condemned. Psychedelic knowledge was never wholly lost, it was forced underground and remains forbidden.

enterprise of "security" and prisons. Government benefits by manipulating cannabis, heroin and cocaine markets for strategic intelligence purposes; it benefits by expanding its security bureaucracy and patronage; by controlling public issues of morality and indoctrination (education, media, "children," etc.); and by using the war on drugs as an open mandate for State terrorism and repression. Against such overwhelming odds, what chance remains for rational humanitarian reform?

Since the reform movement has narrowed its scope to the issues of agricultural hemp and medical marijuana (with the implication that cannabis has a valid role to play in an orderly society), it's worth remembering that in some sense the herb has acted as an agent of chaos ever since the rise of Civilization. Potent psychotropics serve as "effective sacraments" and thus place direct shamanic experience of "other levels of reality" within the grasp of anyone and everyone. The magic plants offer a means of "democratizing" the spiritual experience and allowing all to shamanize at will.

But Civilization depends on mediation. The priest mediates between us and the gods, the king mediates between us and power. Once long ago we had our power, our "personal spirits," our direct experience; now someone else has them. They have been "expropriated" from us as a "surplus" relating to Capital and the State; we are left with "scarcity" — and above all, scarcity of experience. "You can do anything you like — as long as it's unimportant," as the Unabomber puts it.

When cannabis or other sacred plants make their appearance in this Civilized situation, they disrupt the corrupt order of mediation. Thus it is Rabelais, of all European philosophers, who celebrates hemp — and in the Islamic world, it appears under the aegis of heresy and resistance.

In the tribal society of the Neolithic, cannabis appears to have been used openly as a "sacrament," allowing everyone at least a taste of the shamanic experience. But with the rise of Civilization all the entheogens are either de-natured or else condemned — a long drawn-out process, not smooth but erratic, with ups and downs. Psychedelic knowledge was never wholly lost — but it was forced underground, and it remains "forbidden" to this day.

In Europe the knowledge of psychotropics survived in non-literate milieus and thus escaped the notice of History until recently. If hemp and other magic plants were used in cult traditions as long ago as Megalithic "Old Europe," as many scholars believe, then this cult survived to some

extent as "pagan remnants" amongst peasants, wise-women and fairy doctors. Thanks to the Inquisition, some of this knowledge was recorded; other bits were eventually collected as folklore. Thus for example,

In the hinder end of harvest, on All-Hallowe'en,  
When our goode neighbours dois ride, if I read right,  
Some buckled on a buneward, and some on a bean,  
Ay trotland in troupes from the twilight;  
Some saidled a she-ape, all grathed into green,  
Some hobland on a hemp-stalk, hovand to the hight;  
The king of Pharie and his court, with the Elf Queen,  
With many elfish incubus was ridand that night.  
There an elf on an ape an ursel begat,  
Into a pot by Pomathorne;  
That bratchart in a busse was born;  
They fand a monster on the morn,  
Waur faced nor a cat.

In this century revolutionary movements have condemned cannabis as vehemently as the reactionary regimes they oppose, because the herb is seen as the enemy of order, productivity, discipline, militancy, good morals, and the unidimensional rationalist model of human cognition. Capitalism and Communism could agree at least on their hostility to the entheogens.

Obviously not everyone who takes a sacred plant becomes an enlightened liberated shaman or dedicated foe of Civilization! But in the long run the plants are subversive of Civilized rigidity and repression. True, hemp produces wonderful medicines, rope, machine oil, and so on and so forth. But it also produces hashish and madness. In a split society such as ours I see no way to bridge this abyss. Cannabis will remain an outlaw because as a law unto itself it is prior to all law. And this is another reason why the Moorish Orthodox Church chose it as sacrament.

### *Rise of the Green Prophet*

The Indian Hemp Commission Report, in the marvelous *Appendix: On the Religion of Hemp* by J.M. Campbell, reminds us that in Indian Islamic folk tradition the patron saint of hemp is Khezzr, the Green Prophet. Some scholars believe that Khezzr began as a water spirit or vegetation-spirit but trace his origin vaguely to ancient Mesopotamia, ancient India, ancient Saudi Arabi, etc. Islamic tradition identifies him as the mysterious traveling companion of Moses in the Koran, who receives knowledge direct from God, and who brings a dried fish back to life. (Many of



these motifs are as old as the Epic of Gilgamesh.) He is also "conflated" with Elijah by the Jews and St. George by the Christians.

In various Alexander Romances he turns up again as the hired cook for the World Conqueror's expedition to discover the Water of Life or Fountain of Immortality. They traverse the various imaginal lands or realms, each characterized by a single color. In some versions the color sequence follows the symbolism of Islamic alchemy, where green and black represent the highest stages, rather than red and gold as in Western alchemy. The army of Alexander perishes in the Red Land, so that Khezr and the Emperor proceed alone into the Emerald Realm, and then into its heart, the Dark Land. In this permanent night they become separated and lost. Alexander hacks his way back to daylight, but Khezr relies on divine guidance. Angels reveal to him the magic fountain where two immortal fish are seen; he drinks, and attains eternal life. Alexander is outraged that a lowly cook should succeed where he failed. He throws Khezr into the ocean. But Khezr becomes a fish or sea monster, and swims away.

Since Khezr is human but immortal, like a Taoist sage, or the mysterious Comte de St. Germain, he continues to intervene in human affairs. He specializes in rescuing lost desert travelers with water and directions (if he wished, flowers and springs would appear in his footsteps) — but since he is a Prophet of unmediated gnosis, he also "rescues" lost and masterless seekers in the desert of desire. That is, he initiates Sufis who have no "human master." He has appeared to great Sufis such as Ibn Arabi (once in Tunisia on a flying carpet), and has bestowed cloaks on several Sufis who then handed them on and founded Khezri "orders." But the spirit of Khezr cannot be confined within the order of an Order — thus his appeal to a whole sub-tradition of Sufism that rejected authoritarian guru theory and instead depended for initiation on dreams, visions, and "chance" encounters with imaginal beings.

Not long ago, when St. Francis of Assisi was declared patron saint of the ecology movement, some Iranian Sufis nominated Khezr as the Islamic equivalent; sadly the idea never took off. The Prophet Mohammad is supposed to have

praised "water, green things, and a beautiful face" as the noblest of creations — and this would make a good slogan for Khezr's environmental movement as well. Not only hemp is sacred, but also all the "Kingdom of Soma," the whole realm of water and vegetation. The jaguar spirit of ayahuasca, or the Blue Deer of the sacred Huichol peyote, can be validly compared with Khezr as "fish-monster," fertility spirit, and shamanic power-plant. "Heretics of the word, unite" — under the ever-verdant banner of a sacred earth.

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Once Brother Mahmud Irsay and I were staying in Rishikish in a cave (kindly loaned to us by a local yogi) in the hills above the east bank of the Ganges. We were trying to do some meditation but we ran out of ganja. After a desperate day or so we wandered off in search of smoke. (Rishikish is Vishnu's city, not Shiva's, and Vishnu doesn't much approve of grass.) A kindly teahouse owner told us about a nearby vacant field overgrown with the stuff — it turned out to be real ditchweed, almost "rope." But it was certainly better than nothing. We had been living pure yogi lives (whether we wanted to or not, since the whole holy city was ritually meatless and drinkless), and our systems were so pure that the weed had a profound effect. For example I worked on the techniques I learned from Ganesh Baba and Sri Kamanaransan Biswas with some success. We decided that there is no such thing as bad cannabis. Rabelais was right — it is all Pantagrulion, the guarantee of the holy identity of pleasure and realization, of "matter" and "spirit." This is why we consider it a sacrament.

*Hakim Bey is the author of Immediatism and T.A.Z.: The Temporary Autonomous Zone, Ontological Anarchy, and Poetic Terrorism.*

*A longer version of this essay appears in the new Autonomedia book, Orgies of the Hemp Eaters: The Ritual and Recreational Uses of Cannabis, edited by Hakim Bey and Abel Zug.*





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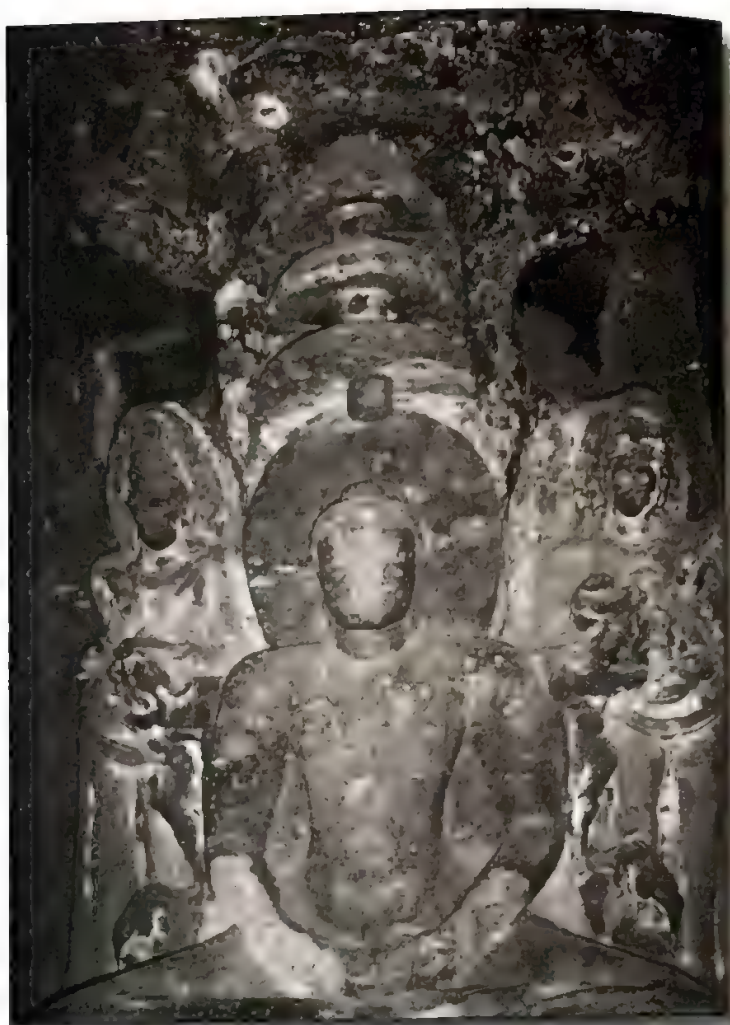
# Do What I Do!

An Accidental Entheogenic Archaeologist in India  
By Adam Fish

On March 19, 2003, Coalition Forces flew over the Iraqi capital of Baghdad releasing from their caches untold numbers of armaments. A few hours before, I too flew over Baghdad, en route to Delhi from Paris. Armed with a camera rifle and a quiver of pencils, as an archaeologist traveling to India to document the decay of sacred world heritage sites, I brought a distinctly different payload to the third world. Where the destabilization that the Iraq War brought to the region encouraged the looting of the National Museum of Baghdad, which before March 19 housed some of the finest and earliest examples of human creativity, my trip was designed to protect legacies of human culture. At a motel around 3AM I flicked on the black and white TV and surveyed the bombing. Under the thundering bombardments, through the BBC remote speaker, I could hear a solemn, dusty song sung in Arabic. Two hours later I heard the same song echoing through the streets of Delhi and I recognized that it was the call for morning prayer for all Moslems. I looked out my motel window, five stories up, upon a confused mosaic of gray washed buildings under a pink-gray sky. Facing east, the direction of Baghdad and Mecca, I kneeled, wept and prayed.

Beginning in Delhi and traveling alone, I had a basic itinerary and a Nepalese driver named Karaka. I traveled from the Indian capital south to three Buddhist caves in Central India called Aurungabad, Ellora and Ajanta, made World Heritage Sites in the '90s, and I visited the holy cities of Champaner, a sixteenth-century Islamic capital, and Hampi, a riotous festival of seventeenth-century Hindu temples and shrines scattered amongst and constructed from tawny boulders, surrounded by verdant well-irrigated crops of rice and plantain. For three weeks I moved quickly, photographed hard, and followed the first principle of world travel: avoid tourists.

Everyone who goes to India, whether they know it or don't want to, is there to satisfy some spiritual need. That is what you do there. Everything about the country forces upon a person experiences which confer or encourage spiritual development. On trains one is forced to meditate. Walking the streets one is made to concentrate with the skill of an archer. Poverty, disease and ever-present danger



Jain caves in Ellora which exhibit a Buddha under a domed temple topped with three tiers of mushrooms. Photo by Adam Fish.

makes one constantly see their own dry skull with tattered scalp skin slung around the neck of Kali-ma. Too much downtime or three too many wrong turns and you, too, may find yourself using a cracked begging bowl. Not to mention that India has bestowed upon the planet the most refined contemplative traditions. Hinduism, Buddhism and Jainism are underlain by a folk tradition of transcendence. There is a temple, grotto shrine, or bearded trident-carrying mendicant on every street block to make you responsible for this history. These elements create a culture that encourages spiritual development and teaches the recognition of spiritual accomplishment.

One of the first frescoes of the Ajanta Caves showed examples of Buddha's last meal, which Wasson suggests was the mushroom, *Amanita muscaria*. Considering that these pictures were very early (c. 400 AD), they are the oldest exhibition of this meal and one of the earliest depictions of entheogenic ingestion. Further upstream in the canyon, I discovered Jain caves which exhibit a Buddha standing



## **Sculptures are not complex symbols, the opposite is true. These sculptures were made to convince an illiterate population to "Do what I do!" Sit here, cross your legs, be quiet, sit up straight. Do it.**

under a domed temple which is topped with three tiers of mushrooms. In the ferocious heat, I apathetically took the photo and smoked charas with a gorgeous Barcelonian woman named Eleanor who, during her week off helping to make housing for the poor in Pune, was staying at the Bagwan ashram and touring Buddhist caves. After the noon heat, I visited a smaller set of four caves, thinking that (aside from the ubiquitous catatonic dog) I had the caves to myself. I entered the black room carved out of a mountainside and a man dressed in white flicked a match, allowing me to see the carvings in the Aurungabad Caves. Aside from gorgeously wrought hand symbols called mudras, in the dim light, I noticed two serpent-hooded bodhisattvas who with much deliberation, precision, and effort were buttressing a vine to grow into the sacrum of a Buddha seated on a lotus. With a simple interpretation, requiring little to no Jungian tango, the importance plants played in building the foundation of Buddhism reached explicit, literal iconographic expression. I let out a massive "Om!" and realized that the acoustics of the cave are also designed as a high-psycho technology.

### ***The saga continued to the final Buddhist cave, Elora.***

Both elements, the mushrooms hovering in tripartite groups above enlightened heads of Buddhas, and vines shoved into the asses of sitting Buddhas, were present at Elora, including one immense sculpture sporting mushrooms colored distinctly like Amanita. Recognizing this, another epiphany broke through: sculptures are *not* complex symbols. The opposite is true. These sculptures were made to convince an illiterate population to learn the most inexpensive and essential life skill in India: patient meditation. Each sculpture says, "Do what I do!": sit here, cross your legs, be quiet, sit up straight. Do it. There is a basic inclination to teach, to rain down transcendence. This mimesis theory seems to have some correlation with recorded experiences of encountering non-human beings in DMT visions. Soon after experiencing this confusing joy of discovery, I climbed to the top of a temple minaret and did a yoga pose which mimics the shape of the temple stupa, my head the most finite top window, my sacrum the door, and Eleanor appeared from behind one of the corner shrines!

By this my second week I had moved out of my Saddhu phase and into the Raj-phase, meaning that I decided to kick

down an exuberant sum for a nice hotel where a bell boy waits at every door decked out in traditional gear. Besides, it was my twenty-seventh birthday. This place had a wet sauna so hot your rings burned and you couldn't sit on the marble. I invited her to come over for dinner and sweat out the week of India filth. She arrived soon after sunset, and we swapped a number of sweats with cold showers. Exhausted under the black sky she and I laid on white marble near a fountain. She brought out a heavy auburn cone of clay which had an inner rod that fit snugly inside the hollow cone. She ripped a tattered fragment off of her orange sarong and tied it around the thinner end of the cone, brought out a small cup made from an immature ash-blackened coconut in which she crumbled up a 1:2 mix of charas and rare ganja which she tightly packed into the wide end of the chillum.

### ***"Om Shiva Shankara Hari Hari Ganga!"***

Ditto. I mimicked her mantra and we began. "I got this pipe from a baba who resides in the Shiva Temple at Hampi." I was to take the overnight sleeper bus to Hampi the next day. Like possessed pumas we did yoga beside the fountain which added moisture to our tan skin before being waited on by twelve boys while we had tea in the dining room, like two British dons before Ghandi had ever marched to the sea for salt. "Shanti, Shanti!" We moved up to my room.

"Have you ever tried DMT?" she asked. I hadn't but there were still two hours left of my birthday so it did not surprise me that I was about to. I freebased DMT and I saw a spark that exploded with fire in the heart of a dry log. "I" glanced up through a foggy dusk jungle and noticed two naked women, my mother and sister, who were watching me and I realized "I" was the first fire made by humans. The achievement of that supreme technology, deeply etched in all human genetic memory, was showing itself. This, the dawn of culture, over a million years ago, was a fitting introduction to one other vision.

I was floating in the sea looking down through clear green-blue waters that had a slight sylvan wave action and a womb-like warmth at a very long sea-beet frond. In the Puget Sound there grow giant red beets that we find cast about on my family's private beach. The root is grotesquely elongated but each of the three fronds which grow from



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## **Everyone who goes to India, whether they know it or don't want to, is there to satisfy some spiritual need. That is what you do there.**

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the tuber is immensely longer. One of these fronds grew quickly from a deep source, so quickly, in fact, that it was zipping by like a fishing reel recently hit by a swordfish, or a movie film without a catch reel spilling out on the floor. Spitting from this loquacious sea beet were glowing gold letters with rich red borders, Sanskrit sentences. The sea beet was like the rolled-up prayers within a prayer wheel, which Tibetans constantly spin, or like the mantras issuing from prayer flags. Spiraling patiently down the Sanskrit vegetable to its root, I got to the sandy floor and noticed the gnarled top of the beet and realized that it looks much like the medieval woodblock print of Mandrake, the important entheogen of the Old World. As I got closer and nearer to inspect the plant spitting out vegetative language it kept frustrating my scientific inspection by leaving my center vision and rotating away, to my right, and behind me. Giving up on requiring that I microscopically "look" with frontal orbitals, the linguistic leaf rotated around and simply assumed its role. It was always my spine. I am a Mandrake trilling and whistling a million filigreed words a minute through the top of my head in a blue-green sea. We ate a small round ball of opium, I welcomed her into the Free-Range Fellowship, and slept until I caught my bus to the sacred citadel of Hampi.

My first goal was to find the Baba who taught Eleanor the art of chillum smoking. Before we slept she gave me the full story of the Baba, how he dosed her whole body with blue ash, dabbled salt on her eye lids, blew incense on meridian points of her body and quivered with joy when she told him that she was to pack a chillum of only cannabis as opposed to partitioning it with tobacco. "It will please Shiva most!" she said. The Shiva Temple was not difficult to find but there are so many bizarre shrines cut into little canyons, rocky outcrops transformed into lingams, and cracks in river-worn rocks morphed into meditation chambers that one can, with great reward, get distracted from worldly pursuits. I found a human mandible cast aside beside a worn out sandal on the trail to the Baba just before I happened upon the little stand that sells bhang lassi.

Bhang lassi is a delicious drink of sour milk, honey, banana and cannabis tops. The drink is hand mashed, sometimes cold with ice, murky and frothy, and always guarantees a smooth and rich daylong high. I downed a six-ounce cup, refused the opium lassi as it would have engendered a dissociative state incongruous to spiritual work, and I found

the Shiva Temple. Hampi is an enchanting village of five hundred temples set around a jewel pond. We were entering the diurnal period of the day, the pelicans in the pond were stretching their wings, a chorus of birds erupted and, as the sun set, drums, chanting, yelps of ecstasy and tablas and tamboras accompanied by holy songs were issued over a loudspeaker all echoing off the percussive pond. I noticed a man who appeared to be circumnavigating the pond, unshod. He stopped and bowed in a swastika-like diagram at many points around the lake. On my way to the Shiva Temple, just outside his eyesight, I followed him and did what he did. At the Ram Temple I bowed towards the setting sun and kneeled towards the nearby Hanuman icon, just as he had. Near the Shiva Temple I met a man dressed in orange with long flowing gray hair and a combed gray beard. I told him I was a Canadian Hindu who had come to meet him. This was the Baba.

The temple is five hundred years old and consists of pillars decorated with tangled serpents and erotic sculptures. A vast sculpture of Shiva, in his Nataraja form, dancing in symmetries, foot raised in defiance of time, his other foot on the back of a repulsive dwarf-ego, and emancipated siddhus offered themselves to the god on either shoulder. Here the Baba put tilak on my forehead and soon I was compelled to repeat my yogic routine. At the pinnacle of each pose I did he nodded and grunted with surprised and proud approval. After I had stood on my head and hands and assumed an upright position he adopted a martial art pose and began doing quick tai-chi motions punctuated by a loud, "Huh!" which accompanied an inward pulse of his stomach. I did what he did and then he asked me to sit cross-legged in front of him at which point he put his moving thumbs over my eyes and pressed rather hard asking, "Do you see the white?" then, "Do you see the person?" As I confirmed both, he told me to remember to go inside and do what that person does.

The next day I left on a sleeper train to Mumbai (Bombay). Awaking in Mumbai I got jacked by an abusive taxi driver who caught me at 6AM with my guard down, confronted the only African people I'd seen in India – all heroin junkies on the street – then, tracked by a tag-team gang of multilingual teenage prostitutes selling their bodies for hefty scoops of mango ice cream and daylong beer cruises in the Arabic Sea. I dedicated myself to fulfilling one more task in India before flying back to Paris and then to Cancun to direct a Mayan



archaeology excavation. I am not sure why, but I needed a turq, those simple white caps that Moslems wear.

In Bombay there are miles and acres of street side vendors peddling local goods and foods. There I noticed the headlines of the April 10, 2003 newspapers. The Americans were in Baghdad, the Second Gulf War was over. This news struck me with a slight depression and frustration. In my month in India I had grown sympathetic to the plight of Middle Eastern poverty, and, like many Indians and most Moslems, suspicious of American-brand democracy. With the war over, markets like this throughout the Middle East will soon be full of non-traditional goods as American-brand democracy spreads from the exhaust of Tomahawk missiles. And though an Islamic regime with many holy sites in its country has fallen on this day a lone American was walking up to every Moslem he saw pointing at their white and gold thread embroidered cap, the symbol of their faith, and asking, "Where did you get it?" Or, more subtly, "Can I do as you do?" Islamic architecture and symbolism attracted me from my first days in India. It displayed a sort of Ken Wilber-esque, post-conventional, post-iconic, post-shamanic chic aesthetic which points more clearly toward the future of religion than the Cabbage Patch dolls with Down's Syndrome in pastel

colors that are worshipped in many Hindu temples, which have more in common with the puppet Mother Mary "Full of Grace!" in John Waters' classic film *Pecker* than something that engenders religious awe.

Each of a dozen Moslems said, "Biddi Bazaar" and pointed north, up the road. After a 50 minute walk, I found the Bazaar and many suspicious looks coming from bookstore owners with Saddam Hussein publicity photo posters for sale in their shop windows. I bought a couple of turqs from an old man and quickly donned one. Returning, I walked past what appeared to be a mosque. I looked at myself in a long white traditional Indian shirt and pants and a bright white Moslem cap and realized that, albeit a little pasty, I could do what they do, and I took off my shoes, washed up in the fountain, scrubbed my feet and entered the clean, well-carpeted hall, where I assumed a position shoulder to shoulder with the rest of the men. Facing East, the direction of Baghdad and Mecca, I kneeled, wept and prayed.


*Adam Fish is a tribal archaeologist in the Pacific Northwest and the Executive Director of the Center for Landscape & Artefact, a nonprofit organization dedicated to multimedia reconstructions of historic places.*



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# Seeing Stars

## The Shifting Geometry of Phosphenes

By Antonio Melechi

**Antonio Melechi offers an account of the study of phosphenes and the role they play in understanding the nature of psychedelic visuals.**

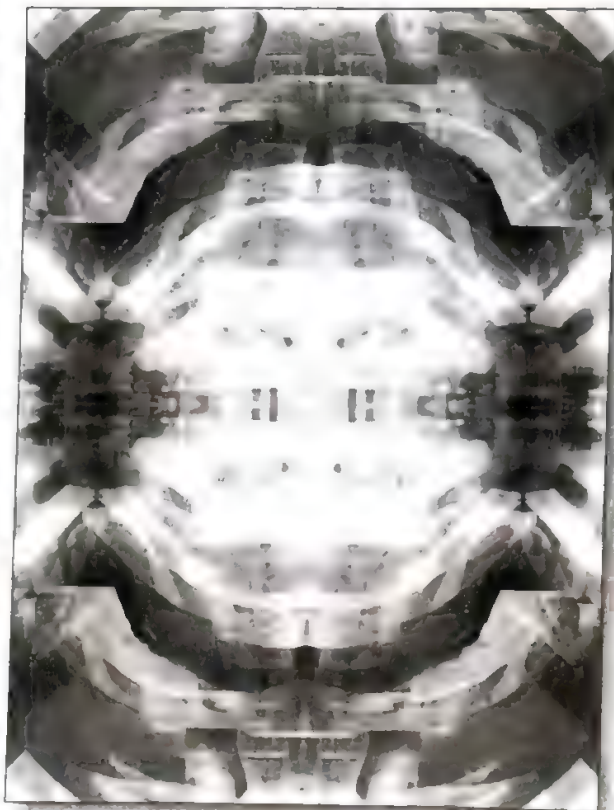
Travelling along a tree-lined county lane to Marseilles, eyes squinting against the afternoon sun, the American painter and writer Brion Gysin was overwhelmed by an "intensely bright pattern in supernatural colour." He was swept "out of time." He was ushered into a "world of infinite number." Still reeling from this vision, recorded in his journal on December 21, 1958, Gysin wondered how the flicker of wintry sunshine through a leafy canopy could have inspired this cloudburst of spectral geometry.

On reading the scientific literature, Gysin found that biologists had stumbled across much the same phenomenon when examining the effects of stroboscopic light on brain rhythms. Exploring the possibility of using the technique in diagnosing epilepsy at the Burden Neurological Institute in the late 1940s, Grey Walter found that a small percentage of non-epileptic individuals were, when exposed to light flickering at somewhere between eight and twenty-five flashes per second, capable of experiencing visions and aura-like affects. Often referred to as "light-dust" and "ocular spectra" by early researchers, but now known as phosphenes, these images were composed of "pulsating checks or mosaic...whirling spirals, whirlpools, explosions, Catherine wheels." In some cases, these patterns of white, silver or coloured light – similar to those stimulated by migraine, fatigue, a blow to the head

or pressure on the eyeball – developed into more complete dream-like imagery. By fashioning a simple flicker machine of his own (a slatted cardboard cylinder on a turntable with a central light) Gysin was able to return to the inner landscape that he had stumbled into.

The first physiologist to purposefully study phosphenes

was Johannes Purkinje, a one-time monk who Goethe encouraged to pursue medical and scientific research at the University of Prague. In 1819, Purkinje began his investigations by replicating Alessandro Volta's experiments with electrodes applied to the face. With his eyes closed, Purkinje observed stripes, arches and other "galvanic light patterns." Purkinje then turned his attention to digitalis, a much-used plant drug that was known to produce impaired and altered vision in higher doses. Unable to "resist the temptation to look for a more exact explanation of the phenomenon," he consumed large doses over a four-day period, making sketches of the flickering



geometrical forms that he continued to see well after the experiment had terminated. Purkinje thought the flickering visions induced by digitalis were due to the stimulation of cranial nerves. However, subsequent experiments with an aqueous extract of belladonna, applied directly to the eye, led him to conclude that similar stellate patterns were brought



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on by cycloplegia, paralysis of the muscles that adjust and focus the eye.

A century on, using more developed means of electrical stimulation, Max Knoll, co-inventor of the electron microscope, was able to unlock the basic grammar of phosphenes. Obtaining sketches from more than a thousand volunteers from diverse cultural backgrounds, Knoll discovered that fifteen basic phosphene shapes – including sunbursts, diamonds, star shapes, concentric circles and checks – were stimulated by low-voltage, square waves of about one volt applied to the temples. Changes in the frequency of the electrical pulse affected the pattern. The widest spectrum of phosphenes was invariably observed by the mentally ill or by subjects who had been primed with a tiny dose of LSD. The particular mechanism involved in the generation of the phosphenes remained open to speculation. The fact that the same luminous visions could be generated by mechanical pressure suggested that the neural network of the retina might well be involved. Yet other electrical experiments pointed to the visual cortex and visual pathways, particularly in the case of phosphene patterns that were unaffected by a shifting gaze.

Here was a universal geometry. As anthropologists, archaeologists and art historians would soon confirm, phosphenes were the ABC of the visionary and sacred arts. From the African rock paintings to Tibetan mandalas, the same shapes had been etched, daubed, inscribed and painted. In the late 1960s, when the Austrian-born anthropologist Gerardo Reichel-Dolmatoff began his fieldwork among the Eastern Tukanoans, he found a pocket of the Colombian Amazon in which the very phosphenes Knoll had catalogued in his Munich laboratory covered everyday objects, clothes, tools and buildings. The Tukanoans witnessed these motifs during the first stages of a religious ceremony in which a potion known as caapi was drunk to facilitate travel beyond the "Milky Way." Reichel-Dolmatoff also discovered that the Tukanoans had coded around half of these into shorthand for teachings connected with mate selection, exogamy and fertility. Where the anthropologist saw shape and pattern, the Tukanoans read signs, warnings and exhortations. But these phosphene visions took the Tukanoans beyond the merely abstract and geometrical. The figurative images and natural scenes perceived by the Tukanoans in the second

phase of intoxication were essentially interpretations of the complex and moving pattern of coloured phosphenes. As Reichel-Dolmatoff put it: "The second phase is culturally conditioned and the visions consist of previously stored informations which are projected upon the screen produced by the drug."

This process of transfiguration had already been observed by a number of medical experimenters. S. Weir Mitchell, one of the first Westerners to experiment with peyote, described how his closed-eye visions always began with the flicker of tiny points of light, like stars or fireflies. From this backdrop of silver starred light emerged scenes composed of "definite objects":

The stars sparkled and passed away. A white stone grew up to a huge height, and became a tall, richly finished Gothic tower of very elaborate and definite design, with many rather worn statues standing in doorways or on stone brackets. As I gazed every projecting angle, cornice, and even the face of the stones at their joinings were by degrees covered with what seemed to be huge precious stones, but uncut, some being more like masses of transparent fruit. These were green, purple, red, and orange; never yellow and never blue. All seemed to possess an interior light, and to give the faintest idea of the perfectly satisfying intensity and purity of these gorgeous colour-fruits is quite beyond my power. All the colours I have beheld are dull as compared to these.

The visions induced by drugs such as peyote and ayahuasca, by flicker or by electrical stimulation, are rarely composed of memory images. Their style of composition is mechanical and anti-realistic. As Havelock Ellis remarked after his own experiments, the play of light "suggested pictures [that] were not really seen." This inability to recall or reproduce natural forms is confirmed by the fact that the animals and beings witnessed in these visions rarely have a sense of scale or physical integrity. Théophile Gautier's account of his hashish fantasia, for example, evokes an array of "goatsuckers, fiddle-faddlebeasts, budled goslings, unicorns, griffons, incubi, an entire menagerie of monstrous nightmares." After taking ayahuasca, the anthropologist Michael Harner reported seeing visions of dragon-like beings which combined pterodactyl-like wings and enormous whale-like bodies. This anti-realism



extends to many types of hallucinations – objects or persons often appear to be enlarged, shrunken, multiplied and misshapen, or comprised of elements that are strangely disparate and incongruous. This is particularly true of the hallucinations associated with Charles Bonnet syndrome, a condition that probably accounts for more hallucinations than schizophrenia.

In 1769, the Swiss philosopher Charles Bonnet described how a cataract operation led his elderly grandfather, Charles Lullin, to perceive “without external stimulus the images of men, women, birds, buildings that change in shape, size and place but which he never accepted as real.” Dominating the left side of his visual field, these visions occurred only when Lullin was standing or sitting. In conversation with the young Bonnet, Lullin would frequently interrupt his learned discourses to describe the progress of an unfolding vision. In later years Bonnet himself experienced “a number of fantastic objects which he recognised as illusory” but a long time would pass before physicians recognized that lucid visions of this kind were so common. In the 1930s, when Charles Bonnet syndrome (CBS) was first proposed as an umbrella term for hallucinations that occur with clear consciousness in the elderly, little was known about the cause or extent of the condition. It is only in the last decade that some advances have been made.

The imagery associated with CBS hallucinations can be simple or complex, static or animated, fleeting or lasting. Recent studies report a preponderance of faces (almost always strangers) and animals (one woman’s hallucinations always featured a “well-dressed monkey”). The formation of these images would appear to follow the same process of phosphene elaboration described by Reichel-Dolmatoff. The historian Hugh Trevor-Roper has recently described “the little circular blobs of kaleidoscopic colour” and “disorderly patterns of dark squares” which he saw in the

first stages of CBS. While these patterns initially imposed themselves on objects and scenes that remained visible to him, the hallucinations progressed into a phantasmagoria of “moving pictures which blocked reality,” including bicycle and horse races, colonnaded Renaissance squares and “a cemetery of dead machines.”

The fact that CBS hallucinations do not respond to anti-psychotic medication would appear to confirm that they are at root physiological. However, geriatric psychiatrists have recently questioned the long-held assumption that CBS hallucinations are caused only by defects of the eye – by glaucoma, macular degeneration, cataracts or diabetic retinopathy. Combinations of visual and cognitive impairments appear to provide the trigger to most CBS hallucinations. Isolation and bereavement have, moreover, been confirmed as significant causative factors. These findings have led Martin Cole of McGill University to propose that the syndrome might be better explained in terms of reduced sensory stimulation rather than fading sight per se. In either event, CBS hallucinations belong to a broad category of visual phenomena that appear to contradict the standard definition of a hallucination. Like the images stirred by flicker, illuminated by peyote and ayahuasca, these visions are not perceptions without a corresponding sensation. They are elaborations of the shifting geometry of phosphenes – the stuff that visions, and perhaps even dreams, are made of.

*Antonio Melechi is the editor of Psychodelia Britannica and Mindscapes. He is currently a Visiting Fellow at the University of York, where he is writing a book on mesmerism and the night side of Victorian science. The above essay is from Fugitive Minds: On Madness, Sleep and other Twilight Afflictions, (Heinemann, 2003).*

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## The Visual Language of Jason Tucker

*Interview by Sara T. Onin*

I first met Jason Tucker in the jungles of Uxmal, Mexico, at one of those week-long entheo-psycho-pharmacological symposiums. Following two mind-twisting back to back presentations by Jonathan Ott and the late Terence McKenna, I hit the poolside bamboo hut bar, where I saw Jason drawing. I too had my sketchbook along, so I sat down and introduced myself. Jason was from Los Angeles, like me. He had a slightly buried southern drawl, and like most Angelenos, was transplanted from elsewhere: San Angelo, Texas to be exact. Turned out we both worked professionally in the film and entertainment industry (he a film editor, me a storyboard artist) and we totally hit it off. I'd scored some excellent blotter from a European attendee and decided to share with my new friend. After dosing, we stepped outside to watch the sun set, the sky slipping into early evening pinks and lavenders. The nearby Mayan ruins turned to dark silhouettes, the pyramid pointing up to unfamiliar constellations replacing the clouds above our heads. Then Jason started drawing. What came out on the paper was unlike anything I'd ever seen, yet at the same time, strangely familiar. It was futuristic. It was archaic. It was Visual Time Travel. And it was Weird. Damn, it was some good acid!

Since then, Jason has spent a great deal of time exploring the dark reaches of inner space, creating over 500 of these unusual drawings and paintings, each completed in one sitting. They've transformed from simple and decorative, reminiscent of Miro or Calder, to a more complex visual narrative, not unlike modern storytelling cave paintings. There are no plans and there are no mistakes. With no pre-set intention, his sessions seem more like a form of "auto-drawing," the images almost giving birth to themselves. He feels the pieces point toward an emotive visual language. During a studio visit to his downtown loft, the Los Angeles County Museum of Art (LACMA) echoed this idea in their newsletter, referring to the work as "an organic visual language evolving into a narrative." I once asked Jason if some shamanic entity from the past and/or future was guiding his hand to spell out messages or if perhaps he was some kind of universal cosmic radio station, broadcasting archetypal mysteries from another time and place. He just smiled slyly.





**TRIP:** So where did your style come from? How did this all start?

**JASON TUCKER:** I began drawing these abstract patterns of triangles, lines, and circles when I was young and it just evolved into a more cellular design direction over the last seven. I can remember resonating with a large abstract mosaic that was on this modern looking Methodist Church in my hometown. And I can recall thinking of it as a pattern of nature, just as organic as any pattern found on a leaf. The difference of course was the human connection. And I guess that struck a chord.

**Did you think you would become an artist?**

I actually consider the drawings to be more of a language than art, especially now that they have increased in volume and have taken on a cellular form.

**I see what you mean about language. When I first viewed your work I felt as though these self-creating beings were somehow speaking to me. Do you recall drawing much as a child?**

I remember my mother would give me these drawing exercises, one of them being to draw what I thought God would look like. I drew this old man behind the clouds operating a rain and thunder machine. I can also remember in grade school not listening to the teacher while drawing these straight lines over and over without a ruler, like I was practicing hand eye coordination or something. And then it developed into abstract patterns after that. I loved geometric shapes at the time, but I didn't care so much about perspective and rulers.

**When did you become interested in the psychedelic experience?**

My first encounter was with LSD and it was not based on any interest at all. I was out of town with my family

attending a wedding and was staying in a hotel room with some family friends, who were a couple of years older than me. I was fourteen. One of them pulled out a tiny piece of paper with a blue UFO on it and cut it into three pieces. They handed me a third of that tiny piece of paper. I placed it on my tongue, and within the first hour I was in the bathroom sitting on top of the counter staring at my face in the mirror as it pulsed in ways that I'd never seen before. The whole room became more alive than I'd ever imagined it could be. What really struck me afterwards was how potent that tiny piece of paper was. We went to the wedding the next day and then back home and to school the next week. I returned to my regular routine and I never thought much about doing it again. Not until the summer after I graduated from college. Then I made up for lost time in the hallucinogenic department.

**When and how did you end up in L.A.?**

I headed out to Los Angeles about 12 years ago. I graduated college and I wanted to work on films so it seemed like the natural thing to do.

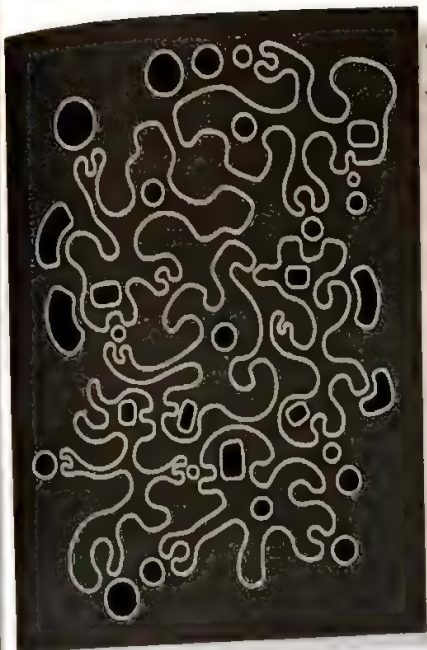
**And you've been drawing this whole time?**

The drawings are always there, coming on stronger at certain times than others.

**So these linear characters, these image entities, have been haunting you for awhile. Are you painting what you actually see?**

Aside from one time on ayahuasca, I've never actually "seen" them. The moment didn't last long, but it was quite the hallucination. A couple of years before that, on psilocybin, I drew something that was just as profound to me as any hallucination. It was another free form drawing like always, but it was no longer the abstract triangles and lines. It was cellular and completely alive. It





had taken on a new form of communication. This opened the door to a flood of similar drawings and a fresh look at some of the ideas I've been interested in over the last twelve years. I certainly don't read Marshal McLuhan the same way, that's for sure.

#### **How does Marshal McLuhan come into this?**

McLuhan talked about how the modes of communication you use determine your reality. If you want to change your mind, change the mode of communication you use. And I find this to be extremely relevant to my experience. He also wrote about the possible moving away from fragmented thinking and towards a reintegration with the tribe and eventually a reintegration with something like the state we emerged from before the development of consciousness. I've read very similar conclusions by Jung. And McKenna has elaborated on it extensively. I see it as a synthesis between the modern and the archaic.

#### **You spent time on occasion with Terence McKenna. Tell me about that.**

In Mexico, I was drawing at a table with a group of people and he walked by and leaned over and watched for awhile. When I was finished I showed him some earlier drawings and explained I did some of them on DMT. He raised his eyebrow and said that it was a precarious enterprise, and that someone was bound to do it. McKenna was McLuhan on hallucinogens. He spoke of psilocybin invoking the Logos. He brought up how DMT works directly on the language centers of the brain. McKenna carried the torch of the irrational with pride and brought in serious talk of the Other, and differentiated between LSD's ties to enlightenment and DMT's potential to

communicate with this Other. Instead of highs and lows, it was becoming more of a trip sideways. The question was no longer about what is beyond the Milky Way, but what's behind it. McKenna was to inner space as Copernicus was to outer space. His refined taste led the psychedelic community into uncharted realms, theorizing that consciousness appears to be heading into the non-linear, raising controversial topics like downloading human consciousness, time travel, new languages, and alien contact. As a film editor, I related just by the tools I use. Nowadays, editing is done on the computer. We digitize information from a linear source tape into software that allows us to edit nonlinearly. I see the ideas of McLuhan and McKenna as connected to the electric age just like the ideas of Freud and Jung are connected to the industrial.

#### **Where do you think you'll go with this from here?**

Soon I'll be animating a "creation myth" using only these drawings. If you've ever seen the splitting of cells as well as the dynamics of cell formation, it's easy to visualize these images slowly moving and morphing into one another.

*Jason Tucker is an animation editor at Warner Bros. Feature Animation. His images can be seen on his web site: <http://www.actualcontact.com>*







In 1995, the Afro Celt Sound System burst onto the global music scene with its innovative album, *Volume One: Sound Magic*, an exciting and unique blend of electronica with Irish and African vocals and influences. Their two follow-up albums, *Volume Two: Release* and *Volume Three: Further In Time*, featured guest appearances by Peter Gabriel, Robert Plant, and Sinéad O'Connor, and with their most recent album, *Seed*, they've dropped the Sound System and are now calling themselves the Afro Celts. The band features a number of notables, including James McNally, formerly a member of the Pogues; Johnny Kalsi, formerly with Transglobal Underground; highly regarded Irish singer Iarla Ó Lionáird; and the band's founder, Simon Emmerson, a well known UK producer. We spoke to Simon after the Afro Celts completed their most recent tour of the States.



# Afro Celts: Seed of Change

Interview by Scotto

**TRIP:** I've seen each of the shows you've played in Seattle. On your most recent show here, you'd moved from having a wall of keyboards looming over the center of the stage to having live drums and bass, and for the first time you had a chance to just play guitar the entire show. Similarly, you've gone from being a "Sound System" to just being the Afro Celts. How did that evolution take place?

Simon Emmerson: We started very much coming out of DJ culture. There was a club in London called the Whirl-Y-Gig. In the early '90s, they were running a regular Saturday evening event in my local town hall, which was a kind of celebration of psychedelic culture without the drugs and alcohol, really, because they had a policy of letting kids in as well as adults. They completely transformed the town hall. The DJ was playing a lot of what's now called "global fusion," but at the time, it was like Transglobal Underground and Loop Guru and African music and a lot of acid house and mixing it up. I'd been working in Africa with Baaba Maal, and that was the inspiration, really, that was the context for the Afro Celts. It was very much a DJ-based idea, bringing a sound system to festivals, and instead of the old kind of turntables, we'd have MIDI gear and stuff. The idea of calling the band an Afro Celt Sound System was to identify us as having a mobile line up with different guests. We weren't specifically a kind of focused band. Like Soul II Soul or Leftfield – Leftfield would do albums with different guests. The idea was that it was sort of a movable feast. Originally I only thought I'd produce a couple albums and then hand the baton on to another producer or another group of people. It wasn't really anchored down to any specific group.

And by the time we recorded *Seed*, that certainly wasn't the case. Myself, Martin Russell and James had been working together for seven years; Iarla, Johnny, and Emer Maycock had been in the band almost as long. After seven years of playing together, we felt we really

needed to evolve and get a proper rhythm section, and it worked out pretty well, although it has created quite a lot of confusion. A lot of people think the Afro Celts are different from the Afro Celt Sound System. What we're probably going to do is Afro Celts is going to represent the more acoustic or organic band, and the Sound System is going to represent more the electronica. We're doing a remix album which is going to be by the Afro Celt Sound System, just to confuse the public even more.

**To keep people on their toes.**

Yeah. But I mean, the name change didn't work. Never underestimate the stupidity of the record-buying public. (laughs)

**A Real World recording week played a role in how you initially formed, and I've always been really curious about what it's like to attend one of those recording weeks.**

I'd been to one before, and I produced an album with a Moroccan Gnawa trance musician – traditional trance, not techno trance – called Hassan Hakmoun, and it was an amazing experience. They're like these wonderful kind of brainstorming sessions, the kind of place where a lot of musicians would like to go to after they die, really. You just walk around these idyllic surroundings and stroll into studios and pick up instruments and collaborate with other musicians. There's a very kind of open vibe. People aren't competing against each other. The general vibe was, "Let's get together and see if it works and try and create new music which crosses boundaries and continents and definitions." Peter Gabriel himself commands a huge amount of respect. He's a kind of enabler. He's one of these people that likes to get people together and see what happens. And I was very honored, privileged to be invited down.

It was after the first recording week that I thought it'd be good to do this in a rather more developed way. So



## He kind of wandered in, the wandering bard. And within an hour, he'd sung "Inion," this beautiful, Celtic/Islamic call to prayer. And we sat there utterly amazed...

when we went back with the Afro Celts, we kind of built a whole studio and recording environment. We were out in one of the garages. We didn't get the big studio that Daniel Lanois had at the time. And that was cool, you know, we were in the garage in the car park around the back, and we had an open door, and had the kettle on, and we had a projector up showing Jamie Reid's artwork. He was our artist at the time, doing the sort of artwork that you saw on the first three albums, and he'd come to us from doing all the punk graphics for the Sex Pistols in the '70s. We had a dozen or so backing tracks, and I invited some of Baaba Maal's band over. We had an open door policy, and that's how *Volume One* happened. It was seven days of joyous collaboration. It was an incredible experience.

I was very nervous at the time. I didn't think I was really qualified to do an Afro Celt album, not being African or Irish. I knew I would get the beats right, or at least make an interesting form of UK dance music, but I was quite worried. I spent enough time in Africa with Baaba Maal's band to have been accepted by them; they were part of the family, really. But the Irish musicians said if we'd made the record in Ireland with Irish producers, it would have been a very different record and probably a lot duller and a lot more conservative.

### How did you hook up with Iarla to get his voice involved in what you're doing?

He just turned up at the recording week. He sent a demo to Real World independently, and when I started putting the Afro Celts together, I was asking Real World about singers. We were thinking of using Baaba Maal, and I was saying, "Are there any Irish singers?" They said, "Well, there's this guy called Iarla Ó Lionáird who comes from this sean-nós tradition of unaccompanied singing." I hadn't actually heard him; he just turned up. He kind of wandered in, the wandering bard. And within an hour, he'd sung "Inion," this beautiful, Celtic/Islamic call to prayer. And we sat there utterly amazed, and then he went on to do the "Lament," which is that slow, evolving, meditative piece that you get as the last track on the first album.

### You've talked in the past about coming from a punk background. How did you get drawn into more of a techno sound over time?

I got into punk in my late teens, because it had the energy and passion and politics and excitement that was lacking in the music business at the time. It was a very exciting time in my life. The punks I was involved with were incredibly open-minded. We were listening to Coltrane and a lot of very avant-garde experimental music. I was in a band called Scritti Politti, who were kind of punk experimentalists. I mean, I didn't go to art school, but a lot of them all went to the same art school, and out of that year of art college, you got Scritti Politti, you got the Gang of Four, you got the Mekons. You also got Soft Cell and various other bands who were all in that kind of mold. So I was into that kind of scene.

I've always had a love of global music. When I was a punk, I started working in a jazz specialty shop, which was basically selling hard bop, be bop, and there was a section there which was kind of a "miscellaneous" where all the African stuff like early Fela Kuti records were stashed. I used to take those records home, and I kind of discovered the whole range of African music in the early '80s. Me and my mates were all trying to copy that kind of Zairean, west African guitar style, because it used to remind us of all the kind of dueling psychedelic guitars you'd have on Grateful Dead or Quicksilver Messenger Service albums, but with a lot more focus. I had a kind of love of Latin music as well. I remember discovering people like Milton Nascimento and the whole Latin pavilion scene in the early '80s. So it was always there.

I've never really liked techno. The techno guy in the band is Mass. He programs for us and he had a band called the Pygmies, and another band called Trench, and they were really really hard core acid techno with a lot of industrial rock over the top. I find a lot of his stuff unlistenable. When he strolls down memory lane and gets those old unreleased demo tapes out, we all kind of head for the door and make excuses and go down to the pub. I've always been into groove-based music and music that crosses boundaries. I produced the *Acid Jazz and Other Illicit Grooves* compilations and at the time, acid jazz was always very much seen as one of the more experimental areas of British dance music.



**I DJ'd at the *High Times* Cannabis Cup awards two years ago in Amsterdam. That was the most boring gig I've ever done. By the end of the night, people just couldn't get off their asses. It was so laid back, it was horizontal.**

**I noticed you were wearing a "Wear Hemp – Hemp Wear" T-shirt... that's the kind of thing a psychedelic editor notices immediately. What kind of role did psychedelic culture play for you specifically in terms of your musical development?**

I was brought up on it. My dad used to manage a band called Screw, who were a kind of prototype Magic Band / Beefheart type band, so as a kid, the first band I ever saw was Captain Beefheart and the Magic Band, and I must have seen Frank Zappa and the Mothers of Invention half a dozen times. The back of our garden was where Soft Machine had their offices. I used to go to all the Soft Machine gigs and was very much a child who grew up immersed in the whole Canterbury, English psychedelic scene, which was an amazingly fertile source of music actually. I've actually got *Pipers At The Gates Of Dawn* signed by the entire membership of the Pink Floyd, back when Syd Barrett was in the band. I'm sitting here talking to you in the very studio where they recorded *Dark Side Of The Moon*. So there you go.

My dad was a Buddhist. He dropped out of society when I was a kid. He went to live in Scotland and lived a completely kind of organic life. He didn't drink or smoke and I guess he was like a prototype Green anarchist. So that side of alternative culture, I kind of grew up with it, although as a punk, I turned my back on it, because I was an angry young man and it wasn't cool to like hippies. But it's kind of funny because all the punks I've known who've kept the faith are now leading figures in the Green movement or within alternative culture.

I'm sorry to say no one in the band really drinks or does drugs...

**That's nothing to be sorry about.**

I DJ'd at the *High Times* Cannabis Cup awards two years ago in Amsterdam. It was full of these American hippies going around from coffee shop to coffee shop, and they had these charts where they were sort of checking off all the various grades of cannabis to find the most pure form of skunk. The fact is, the skunk you get in Amsterdam is just so fucking strong, it's really, really unpleasant. As a DJ gig goes, that was the most

boring I've ever done. By the end of the night, people just couldn't get off their asses. It didn't matter what I played. It was such hard work. It was just so laid back, it was horizontal. It's kind of interesting really, when you go to places like Holland where they've effectively decriminalized cannabis, a lot of people don't really do it or if they do, it's just very occasionally. The kids just don't do it because it's something that their parents do. Then you go to the coffee shops and it's just tourists getting stupidly numbed out.

There are lots of influences in the Afro Celts. I guess Mass still goes out and does the free festival thing. He's still happiest standing in a field with a sound system playing hard core alternative techno at 3:00 in the morning. My days of doing that are over, although I am going down to Devlin tomorrow in west England to do a big free party and it's going to be fantastic. I'll be playing with two musicians from Headmix Collective. We'll do a two hour set, kind of like the old school Afro Celt sets, and that's going to be great. Every society needs its alternative culture. I think you can judge the healthiness of a society by how healthy the alternative culture is, really.

**On your first three albums, you had some key guest appearances. Did you get any pressure from anyone to try to replicate the success of "When You're Falling"?**

Not really, because how many times can you do that? It was a complete fluke. We wrote a track and thought this would be great if Peter Gabriel sang it, and we were kind of expecting him to say no, and then he did it, and it sounded great. That's a once in a lifetime experience. The fact that we got Robert Plant in to do a track is more remarkable. I guess there are other people we'd like to collaborate with, but it's kind of a bit of a double-edged sword, isn't it, because talking to people in America, a lot of the radio stations didn't actually say it was the Afro Celts.

**Yeah, I noticed it kept showing up as "the new Peter Gabriel single."**

"That was the voice of Peter Gabriel." Having said that, it opened up a whole huge market for us. We were number one on the world music Billboard chart for two months.



## The Afro Celts were destined to happen. There was a lot of amazing coincidence, a lot of synchronicity involved...

and sold a lot more records in the first three months than we have for *Seed*. I'm very proud of that record as well. Real World aren't that kind of label. They're not the kind of label that turn around and go, "Come on, guys, we need another massive crossover Celtic African fusion track." You don't get conversations like that with Real World.

**Peter Gabriel is known to be a real perfectionist when he's working on his own music. What was it like collaborating with him to put that track together?**

Well, he just did it. We weren't there. He did it, and we listened and went, "Wow, that's amazing," and that was it. I think it's a lot easier working on other people's stuff than it is on your own. I find that when I'm producing other people's material, I enjoy it more than when I'm doing my own stuff, because you're one or two steps removed from it.

**There was a really great video for that track...**

The video was about to get heavy rotation on MTV, and probably would have pushed the record into a half million sales. Then September 11 happened, and they pulled it, for completely understandable reasons because it's quite a dark video. It's a guy falling through the sky, past an airplane, past a skyscraper, through the ground, and that was that. But we're releasing a remix album early next year, a double record, and there's going to be half a dozen videos on that, including two clips from our second Seattle show, and we're going to put "Falling" on it and a remix of "Persistence of Memory" that's also got a beautiful video, a really lovely video done by a French producer who went to thirty countries in two weeks or something.

**I know it's getting passé to ask musicians this, but I still find it interesting to hear how people respond. What's your take on the way the Internet is affecting ideas of copyright and distribution?**

Well, I'd love to say that music should be free, but we're really, really struggling. When people say to me, "Look, hope you don't mind, I've just downloaded your album off the Internet," I say "Fine, mate, I'll come around and nick your stereo." There's something a little bit weird about the Metallicas of the world sitting on a pile of money and getting huffy about people downloading

their music. But it is, at the end of the day, theft. If I wrote a book and saw somebody photocopying it and handing it out free, I'd get pissed off. You can't make a penny out of record sales in Africa because everything's bootlegged. Musicians can't survive, they can't make a decent living because everything's pirated and comes out on cassettes.

There is something positive about it in as much as you get this massive consumer vote, you get a kind of underground, unmediated consumer vote. The kids say "I want that," and they're not being told to buy it by anybody, they're finding out themselves. Apparently in Britain now, most teenagers spent more time on the Internet than watching telly. My son is massively into UK hip hop – this MC Rascal has just won the Mercury Award, and he was 17 when he made his album, he comes from the east end of London, and his music was available on pirate radio stations and via the Internet. Ted, my son, spent all his time listening to music on the Internet and talking to other producers, and that's very healthy and very positive. We haven't done a single interview in the British rock press, and we've sold a million albums now, we've had two Grammy nominations, but they just won't interview us because we're not considered mainstream enough or whatever, so we do really need alternative sources of exposure. That's where the Internet comes in. We've got a great web site, we've got a great chat room, we've got a great forum. That's the positive side of it. The negative side of it is if it gets any worse, I'll end up driving a cab. I won't be making music.

I guess what we have to do is find ways of making money out of making music that don't necessarily involve CD sales. CDs are ridiculously expensive in the UK. They're like fifteen pounds, which is \$20 or \$25 in America. That's just too expensive; they should be cheaper, and they should be upgraded so they have a DVD element or an interactive element. Our second release had an interactive game on it called Noodle, where you could remix the tracks. I reckon ten or twenty percent of our sales were because of Noodle, because kids were going out and buying it because it was just something very cool, you know what I mean? That's what we've got to do. Record companies have got to find a way of creating a product that is so good that people will buy it. I think the future's got to be DVD, it's got to be 5:1. If everyone has a 5:1 system, you're busting out the stereo into



surround sound and you can really start experimenting with mixes. I mean, talk about psychedelic revolution, that would really take off. Afro Celt music is designed for 5:1, it's designed for surround. We can never contain the amount of information within a stereo framework; our tracks always end up sounding too small. It works live in a big ambient context, but we've done a few surround mixes here in the studio, and it just makes sense. Maybe that's a way forward.

**Your music appeals to a wide range of people in psychedelic culture – the younger ravers who are heavy into electronica, and the aging hippies who were well into world music before the kids figured it out. Did you have any idea that was going to happen?**

To be honest, that was what the Whirl-Y-Gig was always about in 1992. It was about breaking down barriers. The first gig that we did at the WOMAD Festival in Reading, we played to a couple thousand people in this tent in the rain, and it was exactly the audience you were describing. The most exciting moment for me was when I stopped all the programming and James went out and did his bodhran solo. It was the first time we'd done it, the first gig we'd ever done. And then he kind of started dueling with the percussion player. And the cheer we got from the audience, I just remember thinking, "This crowd is

ready for this now. They're really ready to see post-DJ music, post-DJ culture." It didn't surprise me that a lot of the big name DJs when they went over to America never really made it, because there's a limit to standing there watching guys playing records, and I think the bands who survived that have been the bands who have taken one or two steps beyond DJ culture and defined their own sound, like Underworld and Leftfield. Within my scene in London now, a lot of the DJs are forming bands now and going out and playing live, and it's for that very reason that you said – the kids are wanting more than just dancing to three hours of the same kind of groove over again, and the old people are coming back into clubs because the music's becoming more interesting for them.

The Afro Celts were destined to happen. There was a lot of amazing coincidence, a lot of synchronicity involved in the first record. I'll put my hand on my heart and say that we really did have a lot of very positive forces working to make that album happen.

*Scotto writes a monthly column, eScottology, for the Vaults of Erowid, at <http://www.erowid.org/columns/scotto>. He recently published a short story collection, Light Reading For The End Of The World, as a benefit for Erowid, and he is the writer and director of the psychedelic sketch comedy DVD Tales From The Trip Side, both of which are available from <http://www.tripzine.com>. He is the editor in chief of Trip.*



## SEED

The Afro Celts' fourth album soars with Celtic spirit, full of rich melody driven by the band's potent multi-ethnic percussion – showcasing their extraordinary musicianship with an acoustic warmth that recalls the group's debut album.

With guest appearances by Irish singer Mundy, Jah Wobble, fiddler Martin Hayes, Eileen Ivers, flamenco guitarist Jesse Cook, Egyptian percussionist Hossam Ramzy, and Kenya's soulful Ayub Ogada, many new cultural flavors emerge in this most cohesive work yet – spacious, transporting...and totally danceable.



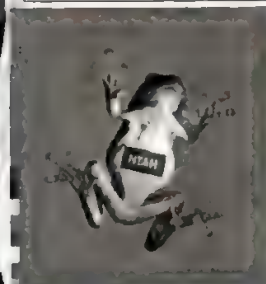
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adrian sherwood

**NEVER TRUST A HIPPIE\***



Legendary producer (Lee "Scratch" Perry, Ministry, Nine Inch Nails, The Cure), On-U Sound label co-founder (Dub Syndicate, African Head Charge), 21st century dub pioneer, and wildly experimental mixer Adrian Sherwood releases his first-ever solo album with guests Sly & Robbie, Temple of Sound and Rizwan Muazzam-Qawwali

In his own words:  
"sci-fi world  
dancehall..."



# This is Your Brain, On Line

By Ramez Naam

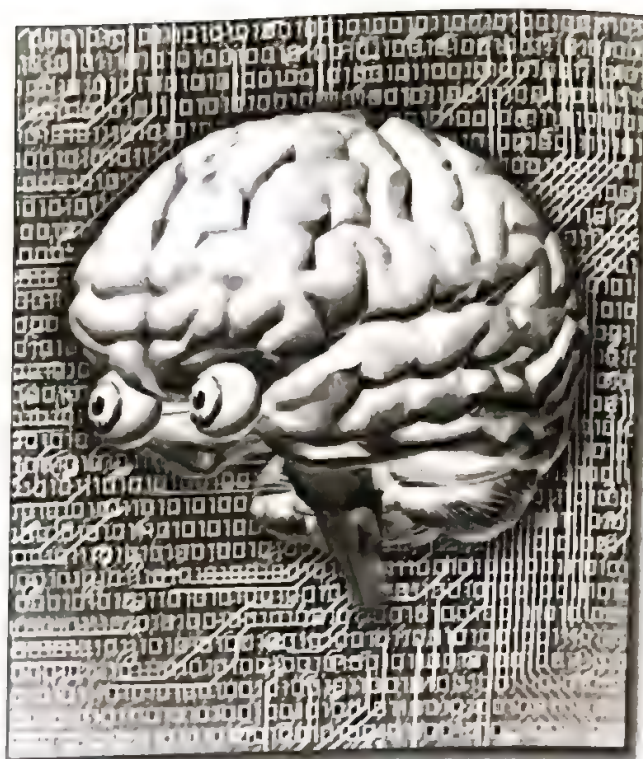
In part two of this tour of the state of modern brain-computer interface (BCI) technology, Ramez Naam speculates about the future of technologically enhanced human beings. He asks: How far can we go with this technology to create a better world both for individuals and global culture?

## SCENARIO 2050: Your Brain

Someday in the future, you take the plunge and have a computer interface implanted in your brain. You're not the type to take this step lightly or quickly, but it's now been ten years since brain-computer interfaces were approved for the general public. Most of your friends have them. You watch with envy as they interact on levels that you can't. You're tired of hearing them tell you what you're missing out on. Still, you're careful. You wait for others to have the procedure. You pore over the safety statistics and most common side effects. You find the model that's least likely to be obsolete a few years down the road. And you choose a doctor that has lots of experience and a good track record in implanting the devices.

You go to the hospital in the afternoon. The anesthesiologist numbs your skull but leaves you awake. As you lay there on the operating table, the doctor makes a tiny hole in your skull. Through this hole she inserts an incredibly light, flexible mesh of circuits. Using tiny tools inserted through the same hole, she spreads the mesh across the entire surface of your brain. Once the mesh is in place, it sends millions of microscopic filaments down into your brain. Each filament is a thousandth of the width of a human hair – much smaller than even the smallest nerve cells. After this, the doctor implants a tiny transmitter and receiver just inside your skull. Finally, she replaces the small amount of bone that she had cut out and coats the area with growth factors to speed the bone's healing. Once this scar heals, there will be no visible sign of your implant at all.

After the surgery, you wait in the recovery room, feeling no different than before. The doctor visits and tells you that the procedure went well and that the interface seems to be working. You rest, eat, and go to sleep. In the morning the



training begins. On the first day, the interface customizes itself to the parts of your brain that handle vision. You're shown a series of pictures on a screen. As you look at them, the implant in your brain monitors the activity of neurons in your visual cortex, noting which ones fire in response to which images. After an hour, your implant has a good working map of your brain. Now, after each image, you're asked to close your eyes. A picture identical to the one you saw on the screen appears in your mind. Occasionally it's wrong in some way and you signal this discrepancy. By early afternoon, your implant is able to send you images and moving pictures with almost perfect fidelity.

You nap and awake for your second training session. This session takes the form of a game. You control a spaceship on the screen. You must avoid obstacles by moving your ship up and down, right and left, forward and back. You have no joystick or keyboard with which to do this. The computer does not respond to your voice commands. You're told to *think* about the way you want to move. You find that by doing this you can sometimes clumsily nudge the ship one way or another. You're frustrated, but the technician jokes about how long it took her to master this game and says that you're a fast learner. Control comes slowly at first, and then faster and faster as you get the hang of it. You could still do better with your hands, but you're getting better. Finally, using the skills you developed in the game, you learn how to control your implant itself. At first you learn only how to activate a mental "screen" on which the implant places information. Then you learn how to move a cursor around that screen and click on the "buttons" the implant projects in your mind.

Late in the afternoon, you're discharged from the



## **Someday in the future, you take the plunge and have a computer interface implanted in your brain.**

hospital. You now have all the tools necessary to explore your new abilities on your own. Your spouse, who already has an implant, takes you home. The next morning, you start another training exercise. You activate the implant and it guides you through training it to project sound into your mind. You slip headphones over your ears and play a selection of sounds and music given to you by the hospital. Just as with your vision, the implant monitors your brain activity in response to the sounds you hear. By the end of the morning, the implant can play sounds in your mind.

In the afternoon, the implant guides you through a set of exercises, training it for touch. You are instructed to touch every part of your body, systematically. You stand, sit, and lie down. You take a hot bath and a cold shower. Through this, the implant learns the specifics of how the sense of touch affects your brain. By doing so, it learns how to stimulate your brain to mimic these effects.

The next day, you start the most intensive phase of training the implant – learning to communicate with language. You relax as the implant uses sight and sound to present you with words, phrases, and sentences. You repeat these to yourself. The implant shows you images, which you name. It instructs you to read paragraphs and pages off of your mental screen. It teaches you to press a mental “send” button at the same time that you mentally speak. By the end of the first day, you have the rudimentary ability to “type” words to the implant by thinking about them. The next day, you practice again. By the end of the third day, you can dictate to the implant as quickly as you can think.

On the following day, you learn to communicate with more than words. The implant shows you how to contact other people with implants. You practice sending words back and forth with your spouse. You're stunned by the ability to communicate silently. Then the implant shows you how to send other senses. You send your spouse what you see and hear and feel. You close your eyes and imagine a flower and a romantic tune and send those as well. Your spouse responds in kind. You begin to explore this incredible way to communicate. You find you can project emotions and even some abstract ideas. In one conversation, you flit back and forth between words, images, sounds, and feelings. That night, you and your spouse make love while opening all of your senses and emotions to each other. The

intimacy is beyond anything you have known. It's almost overwhelming, and you have to retreat. But you know that you will try this again, and that your relationship will reach a new level of depth.

The next day, you return to work. Over the coming weeks, you find your work productivity greatly increased. You can mentally work faster, more easily, and more accurately with teammates who have implants than you can with the non-implanted. In meetings with other implanted workers, you routinely work using mental diagrams, images, and silent speech. In mixed company, you take mental control of the screen, projecting text and images onto it and changing them with a facility you never would have reached with a marker and whiteboard.

In the evenings, you continue to explore your implant. You learn how to use it to control sleep, appetite, mood, arousal, and even your heart rate and respiration. You gain the ability to remain calm merely by willing it. You learn how to use the implant to navigate the internet, accessing the sum total of human knowledge. You begin to train the implant to understand the most basic parts of your memory, attention, and thought processes. It guides you through increasingly complex exercises. You play memory games with numbers, shapes, colors, names, faces, places, and all sorts of objects. You add, subtract, and multiply. You play strategy games and solve mental puzzles. Through all of these activities, the implant studies your brain's activity, learning to interface with your highest functions.

Little by little, you feel yourself getting sharper, as the implant adds to your mental abilities. You phrase mathematical questions to yourself and the implant supplies the answers instantly. You find yourself able to remember twenty digits at a time, where before you could only remember seven. Your attention wanders less at work and you're able to juggle more things in your mind at once. The answers to questions you pose to the internet come back more quickly and sometimes almost before you ask the question. You routinely trade memories and experiences with other implanted humans. You learn to view the world through other people's eyes. You let others see through yours. As the months and years pass, you increasingly view your implant as a vital and natural part of you. Using it becomes as natural as breathing. You can no longer imagine a disconnected life.



**If brain implants can give us abilities and advantages that we can't achieve any other way, then a certain number of people will be willing to risk surgery to get those benefits.**

## ***Science Fiction and Reality***

It's important to separate the potential from the here and now. Blindness and paralysis will not be cured in 2006 or 2008 or even 2010. Current systems can't provide senses anywhere near as rich as those that humans normally enjoy. There are also huge safety and regulatory hurdles to clear before healthy people adopt brain-computer interfaces. Before surgery to implant brain-computer interfaces can become routine, the implants and surgical techniques must be tested on hundreds more humans, and long term safety over the course of years or decades must be demonstrated. History provides an example of how long this can take: It took 20 years for the cochlear implant to move from the first experimental successes to FDA approval for mainstream use.

At the same time, the current research demonstrates what's possible. We've made the fundamental discovery that it's possible to tap directly into the brain and get information of many sorts in and out. Ahead of us is the hard work to turn that possibility into reality.

Even so, we have to ask just how large an impact the current research will have. Most of us have functioning senses and limbs. We don't need a brain implant to restore our sight or hearing or to replace abilities lost to paralysis. And while it would be convenient to be able to pipe video straight into our minds, that extra convenience may never be worth the risk and expense of surgery. After all, if we want to watch a movie we can simply look at a television or computer screen. Indeed, Greg Stock and others have suggested that implanting such capabilities in our brains may make it harder for us to use the latest and greatest technology. Today, when your television, computer, or cell phone is out of date, you can simply buy a new one with the new functionality you want. If your cell phone were on the inside of your skull, you might think twice about having it removed and a new one implanted. In his view, humans will never choose to have surgery to implant a technology when they could just as easily use that technology outside their body. Why get a visual implant if you can just watch movies on a screen built into your contact lenses or eye glasses?

If brain implants could only offer us abilities that we already have or that devices outside our bodies could give us, then Stock would be right. It simply doesn't make sense for anyone to choose the harder, more expensive, and riskier way to adopt a new technology if that path provides no additional benefits. It *does* make sense to take a certain amount of risk to get entirely new capabilities, though. If

brain implants can give us abilities and advantages that we can't achieve any other way, then a certain number of people will be willing to take the risk of surgery to get those benefits. How many people depends on how large the advantages are compared to the risk and expense.

Indeed, even with today's surgical techniques, millions of people are willing to pay out of their pocket, risk their health, and spend time recuperating for completely optional procedures. As of 2002, almost 10 million people worldwide had gone through LASIK or other corrective eye surgeries. The vast majority of these people already had perfect vision by way of eyeglasses or contact lenses. By Greg Stock's criteria, such individuals should never have gone in for surgery. But, in fact, eye surgery does bring some small advantages. It's nice to have the freedom of not wearing glasses or contacts. And apparently almost 10 million people, and more every day, believe that this advantage is worth the time, money, discomfort, and notable risk of having a laser reshape their eye. Even more men and women have opted for cosmetic plastic surgery or non-surgical techniques like Botox injections – trading time, risk, and discomfort for an enhancement of their appearance.

The secret to the success of LASIK and other such optional procedures is that advancing medical technology has made them safe, fast, and easy to recover from. Just twenty years ago the idea of millions of people having elective surgery on their eyes would have seemed insane. But advances in lasers and surgical techniques have made the procedure safe enough that even the relatively small benefits it brings to daily life are worth it. Someday the same will be true of brain surgery. Let's be clear – brain surgery is nothing to trifle with, but even today it's becoming safe and routine. Around a quarter of a million brain surgeries are performed in the U.S. alone each year. New surgical techniques allow doctors to make the tiniest of incisions through the skull and minimize the risk of infection or other complications. The same technological trends that are shrinking electronics and increasing the power of brain implants are also shrinking the size of surgical tools, automating the use of those tools, and making more and more precise operations possible. Most importantly, as doctors install neural implants in the brains of the millions of handicapped people who stand to benefit from them, they'll advance the state of medicine, continually finding ways to shorten the procedures, improve their safety, and decrease the recovery time. Someday, decades from now, brain surgery will be as fast, safe, and effective as laser eye



surgery. And when it is, new vistas will open up.

So far we've made great strides in repairing the damage of deafness, blindness, and paralysis. Now researchers are turning their attention to other kinds of damage – damage to the brain's "higher functions" like memory, attention, emotion, personality, and language. Brain damage is a shockingly common health problem. The CDC estimates that in the U.S. alone, more than 5 million people are living with some sort of disability resulting from injury to the brain. Each year around 80,000 Americans suffer a blow to the head that results in permanent damage of some kind. These people have problems that span the whole gamut of the brain's function – problems with concentration, attention, memory, and perception; reduced ability to plan actions or solve problems; difficulty in controlling mood and emotion; long-term personality changes; depression, fatigue, anxiety, and agitation; and many more. For people who suffer permanent brain damage, today there is often no effective treatment.

Neural implants may offer hope to these patients for the first time. Even now, credible and well-funded researchers are looking at ways the neural implants could combat depression, repair damaged memories, assist the brain in perceiving patterns out of the flood of sensory data it receives, and even facilitate brain to brain communication. These are among the most ambitious research projects in all of neuroscience. If they succeed, they'll pay huge dividends. They'll give patients with certain types of brain damage hope of being restored to full function. They'll open the door to the use of brain implants in curing other types of mental disabilities. Most importantly, they'll teach us a tremendous amount about how the brain works – they'll put us on the path towards cracking the code of the highest functions of our own minds.

With this knowledge we'll go from being able to simply repair damage to these functions to being able to *enhance* these functions. And here is where brain implants become interesting for the large bulk of humanity. An implant that can play video in the mind mostly duplicates the function of existing technologies that don't require surgery. But an implant that can provide us complete control over our own emotions, or an implant that can boost our memory or attention or problem-solving abilities, or an implant that can even allow us to transfer thoughts and memories from mind to mind – such a device would do things that no technology today can truly do. And at the right price, with the right risks, completely healthy individuals would volunteer for surgery to receive the technology's benefits.

## Memory and Perception

Theodore Berger at the University of Southern California is already working on brain implants to repair damaged long-term memories. Researchers have known for decades that an area of the brain called the hippocampus is important in taking our current experiences and storing them away for

later retrieval. People with damaged hippocampi are often unable to form these memories. Like severe Alzheimer's patients or the protagonist in the movie *Memento*, they live day to day with memories of what happened before their brain damage, but nothing since then. Berger and his team hope to correct this with computer circuits that act like neurons in the hippocampus. Over the past decade they've electrically stimulated parts of a hippocampus millions of times and observed the results. Through this, they've built a mathematical model of this part of the brain, and a computer chip that can mimic its functions.

The next step is to test the chip in living animals. In an upcoming study with Sam Deadwyler of Wake Forest University, they'll interface the memory chip with the damaged hippocampus of a primate. The chip itself will sit outside the monkey's skull, communicating with the primate's brain through a smaller set of electrodes implanted in the hippocampus. The goal of the study is to restore the monkey's ability to learn. If it succeeds, then Berger and his team will start to move towards trials in humans that have suffered brain damage to the hippocampus. Those trials are many years away. Even so, Berger and Deadwyler are already talking about the possibility of *augmenting* human memory – making it easier for us to learn new facts or recall things learned long ago.

Berger's work is focused on long-term memory. Yet an even more important part of human cognition is short-term or *working* memory. Working memory is what scientists call our ability to hold multiple concepts or objects in the mind at once, juggling them as appropriate. When you're keeping track of a driver in your blind spot, your working memory is engaged. When you're trying to keep a phone number in mind long enough to write it down, you're using your working memory. For most humans, working memory can handle between six and eight chunks of information at a time. For example, most people can remember up to seven random digits at once. They can also remember a list of about seven words at once.

The size of working memory is correlated to IQ and success on many other intelligence tests. The more concepts you can keep in mind at once, the better you are at solving logic puzzles, finding analogies in words, answering questions about stories you've read, and so on. Working memory also helps us maintain our attention. Researchers have found that when our working memory is full, we have a harder time filtering out distractions and responding to events in the environment. None of this should surprise us. We encounter situations every day in which we have to juggle multiple factors or pieces of information. If we could hold more of them in our mind at once, we could make our decisions more quickly and accurately. If we could look at more factors at once, we could also make better decisions and solve harder problems. Many of the hardest problems in the world today – whether political, social, technical, or scientific – come down to integrating many independent pieces in some way. The more things we can juggle in our



mind at once, the better we'll be at solving these kinds of problems. The *smarter* we'll be.

An ideal brain-computer interface, then, would boost our working memory. As we saw in a previous chapter, it's possible to slightly boost working memory with drugs, so the concept isn't obviously impossible. Using fMRI and PET scans, scientists have also identified several areas involved in working memory, especially the pre-frontal cortex. No one today is working on a neural prosthesis to boost working memory, but it's just a matter of time. Thousands of people suffer damage to the pre-frontal cortex each year. Eventually doctors will turn to the use of neural implants to try to repair this damage. When they do, we may just learn how to boost this part of the brain's function as well.

To crack the code of working memory, scientists will someday implant electrode arrays in the brains of patients with damage to this area. They'll also work with patients who have healthy working memories but are already undergoing brain surgery for some other reason. Just as in language training, they'll run such a patient through a variety of exercises and study the pattern of neural activity in the patient's brain. By doing this they'll be able to study the way the brain encodes different objects in working memory. If we can crack this code we can build an interface that increases working memory by mimicking the neural structures that currently keep ideas in mind. Humans with these boosted working memories will be able to solve problems and make intuitive leaps that un-enhanced humans just can't. A physicist who can juggle twenty concepts instead of seven may see how the pieces of relativity and quantum mechanics could be put together into a new theory that supercedes both. A computer programmer able to juggle more concepts will see more clearly how his part of the program interacts with all the others, and will be able to make it work better, faster, and with fewer errors. In virtually every scientific and technical area, humans with the ability to consider more factors at once will make advances not possible today.

Increasing working memory isn't the only way to improve human problem-solving. Neuroscientists have identified the brain areas involved in various types of planning, in pulling patterns out of the streams of data around us, and in tasks as abstract as mathematics. Virtually every one of these functions can be disturbed by various brain injuries. In the desire to help patients with problems in these tasks, we'll learn much about how the brain encodes our abilities in these areas, and possibly how to enhance them.

## **Pleasure, Pain, and Emotion**

One of the newest areas of brain-computer interaction is also one of the oldest – using electrical stimulation to manipulate human emotion and personality. There are at least 15,000 people alive today carrying deep brain stimulation (DBS) systems for the treatment of severe Parkinson's disease. DBS systems have a dramatic impact on patients whose Parkinson's symptoms can't be controlled

by drugs. It's common for these patients to go from a state of constant trembling to one of complete control over their limbs, immediately after the surgery.

Over the last few years, physicians have found that deep brain stimulators can have a wide range of effects on other conditions as well. Doctors have noted positive side effects of DBS on obsessive compulsive disorder, depression, chronic pain, and addiction. The effects have been compelling enough that several hospitals are now conducting clinical trials on the use of deep brain stimulators to treat these conditions.

Ironically, research into the effects of electrical stimulation on emotion and behavior is in many ways just picking up from where it left off in the 1970s. Starting in the 1950s and continuing through the '70s, Robert Heath and Jose Delgado, two controversial figures in neuroscience, conducted ground-breaking and sometimes disturbing experiments in both animals and humans. Between 1950 and 1952, Heath placed electrodes in the brains of 26 patients suffering from severe mental illness. Those illnesses included incurable epilepsy, Parkinson's disease, schizophrenia, and a variety of psychiatric conditions for which the patients had been hospitalized.

Heath's goal was to understand the pleasure and so-called "aversive" systems in the brain. At first he merely recorded activity. He found that whenever a patient flew into a violent rage, there was a large uptick in activity in the aversive system. Heath found that he could control those symptoms by stimulating the patient's pleasure areas in the septal region of the brain. This area, part of the limbic system, has since been found to be important in a wide variety of human emotions. By stimulating this area, Heath could calm a patient in a rage, reduce anxiety, and induce smiles and giggles. Many of his patients would suddenly talk about how much they loved their doctor and how wonderful it was to be in the hospital. Heath found that he could also remove severe pain, depression, and delusions. Delgado produced similar results. He could make a patient friendlier or more talkative by stimulating the right part of the brain. He could induce sexual arousal, bring up old memories, or even produce complex illusions.

There are other good biological reasons to believe that we can affect mood electrically. For example, most antidepressants work by increasing the amount of serotonin available in your brain. Serotonin is a neurotransmitter used by one neuron to send a signal to the next. Drugs like Prozac and Zoloft prevent neurons from sucking up serotonin, allowing more of it to remain free to signal other neurons. The result is a boost in mood. Another way to achieve this might be to stimulate serotonin-producing neurons to release their serotonin out into the brain. The brain's serotonin neurons are concentrated in a place called the Raphe Nucleus. From there they send out long projections into dozens of other parts of the brain. Just one electrode attached to the Raphe Nucleus could trigger those serotonin neurons to release their serotonin. This would



# Brain-computer interfaces will turn out to be far more powerful tools for sculpting human emotion and personality than any drug.

have a strong euphoric effect.

In fact, BCIs will turn out to be far more powerful tools for sculpting human emotion and personality than any drug. Mind-altering drugs are rather clumsy things. Whether swallowed, injected, or smoked, drugs work their way through the bloodstream and into the brain. In the brain they spread indiscriminately, flooding every part of complex nerve network. Drugs generally have affinity for only one or a few types of neurons, but they act on *every* neuron of that type.

Drugs also take time to permeate our brains, time to work their way out of our system, and time to cause their effects. Prozac takes several days to elevate mood. The illegal drug MDMA (Ecstasy) operates far more quickly, but still takes an hour or more to have its effect. Once the effect has begun, there's no easy way to stop it. The effects will last for several hours, regardless of the desired duration.

Neural implants, on the other hand, can stimulate one neuron while leaving the neuron next to it alone. They can alter our brains in much more precise, sophisticated ways than the simple floods of chemicals that we use today. Because they're more precise, they'll work their magic with far fewer side effects. BCIs will have their effects immediately. Want to reduce pain right now? An electrical pulse can inhibit your pain centers or release a flood of endorphins instantly. Want to elevate mood? That can be done as quickly. And when you no longer want the effect, you can simply turn it off, without having to wait for enzymes in your body to break down the chemical affecting your mind.

Used appropriately, the ability to so radically and immediately alter our emotions is incredibly powerful. With control over your emotions you can easily sculpt your personality in ways that people only dream of today. Imagine being able to change whatever you want about your personality, desires, and behavior. What would you do? Increase your motivation? Give yourself a deep craving for exercise? Suppress your craving for cigarettes or fatty food? Instantly relax yourself after work? Remove some of your jealousy? Increase your love for your spouse or partner? Ease the sting of old unpleasant memories? Make yourself calmer and more collected under stress?

All of these and more are possible. Yet with great power comes great responsibility. With complete control over our emotional life, we become more capable of darker behaviors as well. Addiction is the most obvious of these. Animals with electrodes implanted in the pleasure centers of their brain will hit a lever to stimulate these centers over and over again, often to the point of denying food, water, and

sex. Will brain implants produce a generation of electric addicts equipped with an infinite supply of the one thing they need to get high?

With the power to sculpt our personalities comes the power to make ourselves worse people as well. It's easy to imagine the corporate ladder climber who makes herself more ruthless and less caring of others in order to get ahead. It's easy and frightening to imagine the serial killer who's given himself a deep love of what he does and a complete lack of empathy for his victims.

Yet as dark as these possibilities are, they differ from our present world only by matter of degree. We all sculpt our own personalities to some extent. We all have access to drugs that can destroy our lives – we have only to head to the nearest bar or convenience store for that. And some of us fall into such traps. Yet it seldom happens willingly or intentionally. For the most part we want to be good people. We want to be liked. We want to be confident and calm and happy. We want to be respected by others for our good qualities. We want to be healthy rather than addicted.

Among the first users of brain computer interfaces there will be mistakes. There will be those who go too far in sculpting themselves, and push the edge of sanity. There will be others who addict themselves to pure pleasure. But most uses will improve life rather than degrade it. And we'll all learn from the mistakes. We'll choose implants that are limited in important ways. We'll choose systems that allow us to stimulate our pleasure centers once a day, or once an hour, or whatever limit we deem is safe.

Nor will we do this alone. As we learn to interface electronics with human emotions, we'll learn more than just how to manipulate them. We'll learn how to *communicate* them from person to person. Of course, we already communicate emotion today, in our language, intonation, posture, and so much more. Yet with direct connections between our minds, that level of emotional rapport will deepen dramatically. Here again we see a double edged sword. Expressing our love for each other from mind to mind is a sweet thought. Yet we can as easily imagine a mob high on its shared anger.

Ultimately, taking control of our own emotions means acknowledging our power and responsibility as self-defining creatures. Today we make a thousand choices that create our future selves – our career paths, our friends, what we watch, what we read, what we tell ourselves in the privacy of our own minds. Yet we still, generally, have a fairly static conception of ourselves. I am *like this*: lazy, smart, funny, sexy, hard working, an addict, an outdoor person, an introvert, an extrovert. We can change these traits today.



but slowly and with struggle. With the right technology those changes will be easier and faster. We'll be able to choose whether we're introverted or extroverted, whether we prefer a life of study or a life of adventure, and so much more. It will be hard to say "that's just how I feel" when we have the ability to change our feelings. Our sense of life continuity will change, as we gain the ability to metamorph time and again.

## Language and Communication

When the personal computer was introduced in the early 1980s, it was a tool for increasing individual productivity. In the 1990s, with the arrival of the World Wide Web, the PC found its true calling: a tool for communication. BCIs will probably follow a similar trajectory. Their first role will be to help the handicapped overcome their limitations, but the greatest power of these new interfaces will be in connecting humans to each other and to the worldwide network of computers and information we've created. BCIs will probably make it possible for humans to send images from their minds to computers and other humans. Humans with advanced BCIs will probably be able to project both real and imagined sounds, physical sensations, and emotions as well. Research suggests that imagining a sound or touch uses the same parts of the brain that are activated by actually hearing that sound or being touched. We know less about these areas than we do about visual imagination, but we know enough to tap into them and start searching for the code.

We'd like to go beyond communicating with our senses and emotions, though. We'd like to communicate in words and concepts. We'd like to be able to mentally dictate to our computers. We'd like to be able to have intricate mental conversations with each other. Language allows us to draw complex analogies, describe sequences of events and hypotheticals, and communicate about things that have no real physical representation.

Scientists have known for decades that there are critical parts of the brain involved in processing language. Two structures — Broca's area and Wernicke's area — are involved in the production and comprehension of all language. These areas aren't specific to speech; they're used in sign language, in reading, and in writing. They deal with the actual meanings and structures of words and phrases and sentences, rather than the way in which we communicate them. This tells us that these regions of the brain are involved at a fundamental level in language itself.

Researchers first learned about the function of Broca's and Wernicke's areas by studying patients who had certain kinds of problem speaking or understanding language. Patients with damage to Broca's area are able to understand speech fairly well, but can't effectively communicate. Patients with damage to Wernicke's area can speak and

write, but don't understand what they hear or read. In the last two decades, researchers have also used techniques like EEG, PET, and fMRI to study activity in these areas during language tasks. Results from such studies have confirmed the lessons learned from brain-damaged patients, but these studies have not identified *how* Broca and Wernicke's area encode and decode language.

Neural interface technology is becoming safer and more effective. Eventually researchers will decide to investigate the language areas of the brain in more detail by recording from or stimulating individual neurons. By the time researchers decide to do this, brain chips will be available that can connect to at least thousands of individual neurons. With these implants, scientists will be able to perform experiments similar to the language training process we described earlier in the fictional scenario. A patient will be placed under local anesthesia and have an electrode array placed in one of her language centers. Then researchers will show the patient words and sentences and ask her to repeat them. Activity in her language centers will be monitored, along with how the activity relates to the words being read, listened to, or spoken. By looking at the neural activity side by side with the words, researchers will look for a pattern that relates the two — the code by which these brain areas encode language.

The neural encoding of language will probably turn out to be far more complicated than any pattern we've found in the brain so far. Words can refer to sounds, sights, feeling, people, objects, actions, qualities, events, abstract concepts, and more. Sentences have different meanings depending on the order of the words. Paragraphs can mean different things based on the order of the sentences. Even more important, the meanings of words and phrases differ slightly between individuals. The brain's encoding of language may be different for every person alive.

Despite all of these difficulties, we'll eventually crack the brain's code for language. It may require that we customize our interface for each person's unique code, as we imagined in the fictional scenario that started this article. But we can be sure that there *is* a code there; and as long as there is such a code, a sufficiently smart adaptive interface can find it, interpret it, and use it. We don't know yet how many neurons we'll need to interface with to be able to identify individual words and put them together in the correct order. Fortunately, that won't be an important question for very long. By 2020 we'll be able to interface with a million neurons at a time. By 2030 we'll be able to interface with a hundred million neurons at once. Remember that studying just a handful of neurons can give us a working interface into hearing, sight, touch, or motor control. We can reasonably expect that interfacing with even a few thousand neurons in the language centers at once will give us a reasonable connection. Tapping into millions of them is probably overkill.



## A World of Wired Minds

While *Matrix*-style downloading of new skills and new knowledge is too distant for us to usefully talk about, the other types of augmented thinking, remembering, and communicating we've discussed are closer at hand. Within 50 years, humans with neural implants will be able to communicate in an integrated stream of language, images, sounds, sensations, and emotions. We'll combine these different modalities just as fluidly as we combine speech and hand gestures today, but to much greater effect. One friend telling another about a great date may tell a story in words, images of her handsome escort for the night, the rich sound of the symphony playing, the taste of the wine they drank, the feel of his hand on hers, and the emotional rush of their good night kiss.

Mind-to-mind communication will find applications in the workplace as well. Imagine two engineers planning a project together. As they talk they project mental images to one another – crude schematics of the structure they plan to build. They produce their mental drawings quickly – more quickly than they could draw with pencil and paper or mouse and keyboard. A computer mediates their communication, capturing the images, allowing both of them to work on editing the plan at once, and storing their work for future reference or for publication to others. As they mentally sketch, the computer monitoring their thoughts assists their work. It runs calculations on strength and weight, supplying the information as necessary. It rotates the image more fluidly than a human mind can, letting the engineers see the structure from all sides. It stores the image in more detail than the humans can hold in their minds at once. As each engineer focuses on part of the structure, embellishing and clarifying and refining, the computer integrates it with the whole. In effect, it increases the power of their visual imagination, just as would a drafting board, but far more quickly, intimately, and intuitively.

The applications are as vast and important in science. Albert Einstein said that he owed his discovery of relativity to his ability to visualize space and time. Future Einsteins may discuss their work with their colleagues as much in mental imagery as in words. The idea of a "thought experiment" becomes more powerful when thoughts can be projected to others, or assisted by software and hardware outside the mind.

If science and engineering don't excite you, consider the arts and media. We have never known "multimedia" of the sort that we'll know with direct connections between our minds. Beyond movies we'll see immersive media that touch all of our senses, our emotions, and more. We'll build virtual worlds with one another that are as far beyond the crude VR goggles available today as movies are beyond comic books. Every type of mass communication will be affected, from movies to poetry, from music videos to educational texts, from live concerts to museums. All will be enriched by the ability to communicate on so many levels

and so intimately.

The most intimate personal communications will be affected as well. We'll be able to replay important memories and events for our closest friends and loved ones. We'll be able to clarify confusion and miscommunication through the direct expression of emotion. We'll be able to share sensation and emotion in real-time, showing others how they're affecting us as it happens. We'll be able to form deeper friendships. We'll be able to make love with a depth and communion never before possible. We'll be able to feel the emotions of those we least understand, and to build a bridge between us.

Of course we'll be able to hurt and deceive. Nothing about this communication guarantees honesty. But we're already familiar with deceit. It's possible in every medium we have available today, from spoken word to printed page to internet video. Yet each of these modes of communication has improved the state of the world. While they're used to deceive, they're also used to educate, inform, and entertain. Most importantly, their use connects and synergizes. Our global culture – everything we have from the wheel to space travel – is only possible because of our ability to communicate with one another.

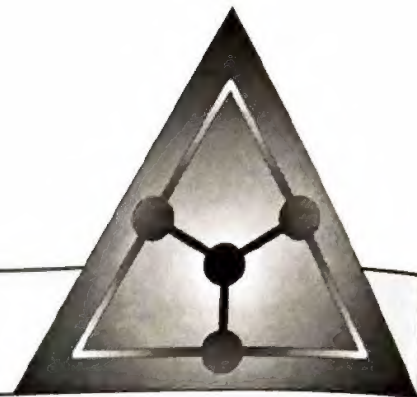
In his book *Non Zero*, Robert Wright proposes a fascinating theory of human history. Wright draws upon a mathematical field known as game theory. In game theory there are "zero sum" games where one can only benefit at the expense of another. There are also "non-zero sum" games, where the total benefit and harm to the parties involved does not have to balance out. In non-zero sum games, each player can benefit, without any need to harm the others. Looking over 20,000 years of human history, Wright comes to the conclusion that mankind has repeatedly developed new ways to communicate and coordinate our activities to make our interactions more non-zero sum. That is to say, we've invented new ways of working together so that we all benefit. The printing press is a perfect example of this. An author who puts down his work in a book loses very little, and may indeed gain for himself. At the same time, the entire rest of the world may gain tremendously by consuming the knowledge he shares. The total gain for the world far exceeds the loss or effort put in.

Direct mind-to-mind communication is another step in integrating humanity and turning our world into one where the total benefit is greater than the sum of our efforts. History suggests that as more people are able to communicate with one another in more ways, we all benefit. The collective intelligence of our world increases. The diversity of the thoughts and ideas in our world increases. And, we may hope, as we learn to communicate our emotions directly, the collective *empathy*, *compassion*, and *maturity* of our world may increase.

*Ramez Naam is a computer scientist and writer living in Seattle. His forthcoming book, More Than Human, will be released in the fall of 2004.*







## Dear Vladimir, I Think I Love You

by Abrupt

"By the Category of Conceptual Reversion, there is secondary origination of conceptual feelings with data which are partially identical with, and partially diverse from, the eternal objects forming the data in the first phase of the mental pole."<sup>1</sup> Thus novelty enters the world. Thus too can Vladimir Putin be considered as a society of actual occasions whose intensity of satisfaction increases in direct proportion to the amount of "order" in the data determinant of his genetic endurance as "Putin." In this case the primary example of such order is the quality of blood delivered regularly by his ex-KGB associates to the secret satin-lined bedchamber deep beneath the Kremlin.

The individual occasions of blood cells become incorporated into the society "Putin" as a subservient nexus, transmuted and folded into the process of his becoming. It is the subjective origination of feeling in Putin's mental pole which elicits novelty in subsequent stages of process. Oh, you should see him after one of those plasma benders, flush with the life of some virgin fishing villager from the shores of the Baltic. Thanks to the technology transfer of recent years, Putin reaps the rewards of increased molecular filtration and augmentation efficiency pioneered by the Americans. No more "disappearing" whole Siberian prison camps just to make it through the winter; now one or two cultivated deliveries has him back on top. Still, there's nothing like the occasional unadulterated potato farm girl to spice things up. The effects are shorter-lived, but so much richer, so much deeper...

In his private journal, composed under a microscope on thin sheets of potato paper, Putin describes the experience. "It is as if I swim through a grotto of mulled cider, aromatic, sensuous and warm. I am rocked by its rhythms, tossed by its waves. Then my senses clarify, as I break through the surface after what seems eons of submersion. I see through to the essence of things, see the life-blood pulsing through this coarse matter in breathtaking gradations of detail. I am strong, and yet deeply humbled. For I see all life is bleeding, sapped of its substance through innumerable tears and lesions. In my folly I know I am the very deepest of those cuts, stealing life in order to glimpse Life, hurting in order to feel. This is the sadness that taints my beauty, or no — the beautiful must contain such sadness, lest it flatten and dry of sheer permanence. In my folly I am a thief, picking the pockets of Life, but in my glory I am an angel of Impermanence, distilling eternal filth into a clear and a pure elixir. In the shadow of my own dissolution I find this one solace — that I wrest this drop of beauty from so much, so much horror."

The tiny sheets of paper are saved in a crystal box. When the time is right they are lifted out with tweezers and ceremonially placed under the tongue of his victims, where they dissolve and the words enter the bloodstream. Thus does novelty enter the world.

<sup>1</sup> Alfred North Whitehead, from *Process and Reality*. *The Category of Conceptual Reversion is Categorical Obligation V*.





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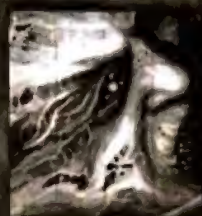
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